

SECTION 150000 - BASIC MECHANICAL REQUIREMENTS

- PART 1 GENERAL
A. GENERAL CONDITIONS OTHER CONTRACT DOCUMENTS
1. THE GENERAL CONDITIONS AND OTHER CONTRACT DOCUMENTS AS SET FORTH HEREIN ARE TO BE INCORPORATED INTO AND BECOME A PART OF THE SPECIFICATIONS FOR THE WORK UNDER THIS DIVISION.
B. CODES AND PERMITS
1. COMPLY WITH RULES, REGULATIONS OF STATE, COUNTY, AND CITY AUTHORITIES HAVING JURISDICTION OVER THE PREMISES, INCLUDING SAFETY REQUIREMENTS OF OSHA. DO NOT CONSTRUE THIS AS RELIEVING CONTRACTOR FROM COMPLYING WITH SPECIFICATIONS WHICH EXCEED CODE REQUIREMENTS AND NOT IN CONFLICT THEREWITH.
2. SECURE AND PAY FOR ALL PERMITS AND CERTIFICATES OF INSPECTION REQUIRED. MAKE PAYMENTS TO ALL PUBLIC UTILITIES FOR WORK PERFORMED BY THEM IN PROVIDING SERVICE CONNECTIONS.
C. LOCAL CONDITIONS
1. VISIT SITE, BECOME FAMILIAR WITH CONDITIONS AFFECTING THIS WORK. NO ADDITIONAL PAYMENT WILL BE MADE ON CLAIMS THAT ARISE FROM LACK OF KNOWLEDGE OF EXISTING CONDITIONS.
2. THIS CONTRACTOR SHALL BE HELD TO HAVE EXAMINED THE PREMISES AND SITE SO AS TO COMPARE THEM WITH THE DRAWINGS AND SPECIFICATIONS. NO ALLOWANCE SHALL BE MADE TO THE CONTRACTOR BY REASON OF HIS FAILURE TO HAVE MADE SUCH EXAMINATION OR OF ANY ERROR ON HIS PART.
D. DRAWINGS
1. DRAWINGS AND SPECIFICATIONS ARE TO BE CONSIDERED AS SUPPLEMENTING EACH OTHER. WORK SPECIFIED SHALL BE PERFORMED OR FURNISHED AS THOUGH MENTIONED IN BOTH SPECIFICATIONS AND DRAWINGS.
2. THE DRAWINGS ARE SCHEMATIC ONLY AND ARE INTENDED TO SHOW THE APPROXIMATE LOCATIONS. DO NOT SCALE.
E. SHOP DRAWINGS
1. THIS CONTRACTOR SHALL SUBMIT SHOP DRAWINGS ON THE ITEMS OF EQUIPMENT AND SYSTEMS AS NECESSARY TO CLEARLY SHOW EQUIPMENT AND CONSTRUCTION.
F. SUPERVISION
1. THIS CONTRACTOR SHALL HAVE IN CHARGE OF THE WORK, A COMPETENT SUPERINTENDENT WITH EXPERIENCE IN THE WORK TO BE INSTALLED UNDER THIS CONTRACT.
G. COORDINATION
1. THIS CONTRACTOR SHALL COORDINATE HIS WORK AND COOPERATE WITH THE OTHER TRADES WHICH COMES IN CONTACT WITH HIS WORK THEIRS SO THAT THERE WILL BE NO DELAY IN THE PROPER INSTALLATION.
2. EXAMINE WORK OF OTHER TRADES WHICH COMES IN CONTACT WITH OR IS COVERED BY THIS WORK. DO NOT ATTACH TO, COVER, OR FINISH AGAINST ANY DEFECTIVE WORK, OR INSTALL WORK OF THIS DIVISION IN A MANNER WHICH WILL PREVENT OTHER TRADES FROM PROPERLY INSTALLING THEIR WORK. CONSULT ALL DRAWINGS, SPECIFICATIONS AND DETAILS OF OTHER DIVISIONS OF THE WORK.
H. GUARANTEE AND WARRANTIES
1. WARRANT THAT EQUIPMENT AND ALL WORK IS INSTALLED IN ACCORDANCE WITH GOOD ENGINEERING PRACTICE AND THAT ALL EQUIPMENT WILL MEET REQUIREMENTS SPECIFIED. ANY EQUIPMENT FAILING TO PERFORM OR FUNCTION AS SPECIFIED SHALL BE REPLACED WITH COMPLYING EQUIPMENT, WITHOUT COST TO THE OWNER.
2. GUARANTEE AGAINST DEFECTS IN WORKMANSHIP AND MATERIALS; MAKE GOOD REPAIR OR REPLACE ANY DEFECTIVE WORK, MATERIAL OR EQUIPMENT WITHIN ONE YEAR FROM DATE OF ACCEPTANCE.
PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION - NOT USED
END OF SECTION

SECTION 150500 - BASIC MECHANICAL MATERIALS AND METHODS

- PART 1 GENERAL
A. REFER TO INDIVIDUAL PIPING SYSTEM SPECIFICATION SECTIONS FOR PIPE, FITTING, JOINING MATERIALS AND METHODS. PIPE THREADS SHALL COMPLY WITH ASME B1.20.1 FOR FACTORY-THREADED PIPE AND PIPE FITTINGS.
B. FURNISH AND INSTALL MANUFACTURED ESCUTCHEONS FOR EXPOSED WALL AND CEILING PENETRATIONS. INSTALL DIELECTRIC UNIONS WHEREVER JOINING DISSIMILAR METALS TO PREVENT GALVANIC ACTION AND CORROSION.
C. FURNISH AND INSTALL SLEEVES FOR WALL, FLOOR SLAB AND ROOF PENETRATIONS WITH A MIN. TWO SIZES LARGER THAN PIPE OR INSULATION; STEEL PIPE: ASTM A53, GRA. SCH. 40 GALV. PLAIN ENDS. PVC PLASTIC PIPE: ASTM D1785, SCH. 40.
D. FURNISH AND INSTALL EQUIPMENT NAMEPLATES IDENTIFYING UNIT NUMBER AND AREA SERVICED BY UNIT. PIPING SYSTEMS SHALL HAVE SNAP-ON PLASTIC PIPE MARKERS TO INDICATE SERVICE AND FLOW DIRECTION.
E. INSTALL PIPING FREE OF SAGS AND BENDS TIGHT TO SLABS, TRUSSES, JOISTS, COLUMNS, WALLS, AND OTHER BUILDING COMPONENTS. ALLOW SUFFICIENT SPACE ABOVE REMOVABLE LAY-IN CEILINGS FOR PANEL REMOVAL.
F. REFER TO DIVISION 9 SECTION "PAINTING" FOR FIELD PAINTING REQUIREMENTS.
G. VALVES:
1. BALL VALVES, 2" AND SMALLER: RATED FOR 400 PSI WOG - TWO PIECE CONSTRUCTION WITH TEFLON SEATS AND SEALS. VALVES SHALL BE NIBCO MODEL S-580-8R OR APPROVED EQUAL.
2. PLUG VALVES, 2 1/2" AND LARGER: RATED AT 175 PSI WOG, LUBRICATED PLUG TYPE, SEMI-STEEL BODY, WRENCH OPERATED WITH FLANGED ENDS. VALVES SHALL BE NORDSTROM 143 OR APPROVED EQUAL.
3. CHECK VALVES, 2" AND SMALLER: RATED AT 200 PSI WOG, CAST BRONZE BODY, HORIZONTAL SWING, Y-PATTERN AND BRONZE DISC. VALVES SHALL BE NIBCO MODEL S413 OR APPROVED EQUAL.
4. OTHER APPROVED: CRANE, HAMMOND, JAMESBURY, JENKINS, KEYSTONE, POWELL, STOCKHAM, AND WATTS.
H. HANGERS AND SUPPORT COMPONENTS SHALL BE FACTORY FABRICATED OF MATERIALS, DESIGN AND MANUFACTURER COMPLYING WITH MSS SP-58.
1. DOMESTIC WATER PIPING 2 1/2" DIA. AND SMALLER: GRINNELL FIG. NO. CT-89 TUBING HANGER WITH FIG NO. 167 PROTECTION SHIELD.
2. STORM/SANITARY WASTE AND VENT PIPING: GRINNELL FIG. NO. 260 ADJ STEEL CLEVIS HANGER FOR HORIZONTAL PIPING, GRINNELL FIG. NO. 261 STEEL RISER CLAMP FOR VERTICAL PIPING WHERE PIPING IS SUPPORTED FORM OVERHEAD WOOD TRUSSES, USE GRINNELL FIG. NO. 153 PIPE HANGER FLANGE.
3. HANGER RODS SHALL BE ASTM A-107 CONTINUOUS THREADED WITH THE FOLLOWING LOADING: 3/8" - 610 LBS., 1/2" - 1130 LBS., 5/8" - 1810 LBS. AND 3/4" - 2710 LBS.
4. HANGER SPACING AS FOLLOWS:
a. STEEL PIPE - AT INTERVALS NOT EXCEEDING 12'-0".
b. COPPER PIPE - 1 1/4" AND SMALLER 6'-0" INTERVALS 1 1/2" AND LARGER 10'-0" INTERVALS.
c. CAST IRON PIPE - AT INTERVALS NOT EXCEEDING 10'-0".
d. PLASTIC SCH. 40 PIPE - AT INTERVALS NOT EXCEEDING 4'-0".
5. HANGERS MANUFACTURED BY FEE AND MASON, B LINE AND HYDRA-ZORB ARE ALSO ACCEPTABLE.
6. MISCELLANEOUS STEEL PLATES, SHAPES AND BARS: ASTM A36.
I. PIPE SUPPORTS:
1. COPPER TUBING: ADJUSTABLE STEEL CLEVIS HANGER, B-LINE B3104CT.
2. UNINSULATED PIPING: ADJUSTABLE STEEL CLEVIS HANGER, B-LINE B3104 OR B3100.
3. INSULATED HOT PIPING (2 INCH AND SMALLER): ADJUSTABLE STEEL CLEVIS HANGER WITH GALVANIZED SHEET METAL SHIELD, B-LINE B3100 WITH B3151 SERIES.
4. INSULATED COLD PIPING (4 INCH AND SMALLER): ADJUSTABLE STEEL CLEVIS HANGER WITH GALVANIZED SHEET METAL SHIELD, B-LINE B3100 WITH B3151 SERIES.
5. PLASTIC PIPING: ADJUSTABLE V-BOTTOM TIE CLEVIS HANGER WITH GALVANIZED 18 GAUGE CONTINUOUS SUPPORT CHANNEL, B-LINE B3106 WITH B3106V SERIES. MANUFACTURERS: B-LINE, ANVIL (GRINNELL), MICHIGAN, PHD, HILTI, HOLDRITE OR APPROVED EQUAL.
6. MULTIPLE OR TRAPEZIE HANGERS: 12 GAUGE, ROLL FORMED, ASTM A670 GRADE 33 STRUCTURAL STEEL CHANNEL, 1 5/8 INCH X 1 5/8 INCH COATED STEEL CHANNELS WITH SPACERS AND HANGER RODS, B-LINE B22 STRUT OR STRONGER AS REQUIRED. MOUNT PIPES TO TRAPEZIE WITH TWO-PIECE PIPE STRAPS SIZED FOR OUTSIDE DIAMETER OF

- PIPE/INSULATION, B-LINE B2000 SERIES, MANUFACTURERS: B-LINE, UNISTRUT, SUPERSTRUT OR APPROVED EQUAL.
K. WALL SUPPORT: (PIPE SIZES TO 3 INCH): CARBON STEEL HOOK, B-LINE B3191, MICHIGAN, PHD, HILTI, HOLDRITE OR APPROVED EQUAL.
L. VERTICAL SUPPORT: STEEL RISER CLAMP SIZED TO FIT OUTSIDE DIAMETER OF PIPE, B-LINE B3373, MICHIGAN, PHD, HILTI, HOLDRITE OR APPROVED EQUAL.
M. FLOOR SUPPORT (HOT PIPE SIZES TO 6 INCH AND ALL COLD PIPE SIZES): CARBON STEEL ADJUSTABLE PIPE SADDLE (SCREWED OR WELDED TO APPROPRIATE BASE STAND) AND NIPPLE ATTACHED TO STEEL BASE STAND SIZED FOR PIPE ELEVATION, B-LINE B3093, B3088T, B3090 OR B3088, MICHIGAN, PHD, HILTI, HOLDRITE OR APPROVED EQUAL.
N. HANGERS SHALL BE DESIGNED TO IMPEDE DISENGAGEMENT BY MOVEMENT OF SUPPORTED PIPE.
O. PROVIDE STONEMAN TRIANGULATORS OR EQUIVALENT OR 1/4 INCH THICK HAIR FELT AT ALL COPPER PIPE HANGERS OR SUPPORTS, EXCEPT NONE REQUIRED FOR INSULATED HOT PIPES.
P. HANGERS AND CLAMPS FOR SUPPORT OF BARE COPPER TUBING SHALL BE COATED WITH COPPER-COLORED EPOXY PAINT. AN ADDITIONAL PVC COATING OF THE EPOXY-COATED HANGER SHALL BE APPLIED WHERE REQUIRED BY THE TENANT'S AUTHORIZED REPRESENTATIVE.
Q. HANGERS FOR OTHER THAN BARE COPPER PIPING SHALL BE ZINC PLATED IN ACCORDANCE WITH ASTM B633-3C3 OR SHALL HAVE AN ELECTRO-DEPOSITED GREEN EPOXY FINISH.
R. STRUT CHANNELS SHALL BE PRE-GALVANIZED IN ACCORDANCE WITH ASTM A653-680 OR HAVE AN ELECTRO-DEPOSITED EPOXY FINISH.
S. ROOF SUPPORTS FOR PIPE SIZES TO 3 INCH: POLYCARBONATE RESIN ROLLER AND NYLON ROD SITUATED IN A POLYCARBONATE RESIN BASE, "U" SHAPED CRADLE, GUIDE HOLES PROVIDED FOR MOUNTING STRAP (USING 1/2 INCH #10 SCREWS) AND SPACERS AS REQUIRED, SPACED MAXIMUM 10'-0" ON CENTER, MIRO 24-R OR APPROVED EQUAL.

PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION - NOT USED
END OF SECTION

SECTION 152500 - MECHANICAL INSULATION

- PART 1 GENERAL
1. FURNISH AND INSTALL INSULATION FOR DUCTWORK AND PIPING AS DESCRIBED IN CONTRACT DOCUMENTS. SUBMIT PRODUCT DATA FOR EACH TYPE OF MECHANICAL INSULATION FOR THE DATA FOR EACH TYPE OF MECHANICAL INSULATION FOR THE PROJECT, IDENTIFYING R-VALUE, THICKNESS, AND ACCESSORIES.
I. INSULATION SHALL HAVE A FLAME SPREAD RATING OF 25 OR LESS AND A SMOKE DEVELOPED RATING OF 100 OR LESS.
2. SCHEDULE INSULATION APPLICATION AFTER DUCT AND PIPING TESTS HAVE BEEN COMPLETED.
PART 2 PRODUCTS
1. GLASS FIBER: INORGANIC GLASS FIBERS, BONDED WITH A THERMOSETTING RESIN.
a. BLANKET: 1-1/2" THICK WITH ALUMINUM FOIL SCIRM KRAFT FACING AND 1 LB/CU FT. DENSITY, OWENS-CORNING FRK.
b. PREFORMED PIPE INSULATION: 1" THICK WITH REINFORCED ALL SERVICE VAPOR RETARDER JACKETING, OWENS-CORNING FIBERGLASS ASJ.
c. DUCT LINER: 1" THICK COATED WITH A BLACK PIGMENTED FIRE-RESISTANT COATING ON THE AIRSTREAM SIDE AND 1-1/2 LB./CU. FT. DENSITY, OWENS-CORNING AEROFLEX.
d. OTHER APPROVED MANUFACTURERS: CERTAINTED, KNAUF, AND MANVILLE.
PART 3 EXECUTION
1. SELECT ACCESSORIES COMPATIBLE WITH MATERIALS SUITABLE FOR THE SERVICE THAT DO NOT CORRODE, SOFTEN, OR OTHERWISE ATTACK THE INSULATION OR JACKET.
2. SLIP INSULATION ON THE COLD AND HOT WATER PIPE AND SEAL JOINTS WITH ADHESIVE, WHERE THE SLIP ON TECHNIQUE IS NOT POSSIBLE, CUT ONE SIDE LONGITUDINALLY AND APPLY TO THE PIPE. SEAL SEAMS AND JOINTS WITH ADHESIVE.
3. INSULATE FINISHED PLUMBING LINES TO FIXTURES ACCESSIBLE TO THE DISABLED WITH 3/8" ARMSTRONG ARMAFLEX OR EQUAL.
4. DUCTWORK APPLICATION:
a. ALL RETURN AIR DUCTWORK IS TO BE LINED WITH DUCT LINER.
b. ALL SUPPLY DUCTWORK LOCATED IN CONCEALED AREAS OR ABOVE THE CEILING IS TO BE WRAPPED WITH BLANKET INSULATION. THE FIRST 15'-0" OF THE SUPPLY DUCTWORK FROM THE ROOFTOP UNIT IS TO BE LINED WITH DUCT LINER. WRAP INSULATION CAN BE OMITTED ON SECTIONS OF DUCTWORK INSTALLED WITH DUCT LINER.
c. ALL SUPPLY DUCTWORK IN STOCKROOM IS TO BE UN-INSULATED.
d. FOR THE EXPOSED DUCTWORK IN THE SALES AREA, THE FIRST 15'-0" OF THE SUPPLY DUCTWORK FROM THE ROOFTOP UNIT IS TO BE LINED WITH DUCT LINER. IF CONCENTRIC DIFFUSERS ARE MOUNTED DIRECTLY BELOW THE ROOFTOP UNIT, ALL OF THE SUPPLY DUCTWORK SHOULD BE LINED TO THE CONCENTRIC DIFFUSERS.
5. DOMESTIC COLD AND HOT WATER PIPING IS TO BE INSULATED WITH 1" PREFORMED PIPE INSULATION.

END OF SECTION

SECTION 154100 - PLUMBING PIPING

- PART 1 GENERAL
1. FURNISH AND INSTALL PLUMBING PIPING AS SHOWN ON DWGS. WITH THE LOCAL WATER UTILITY COMPANY'S STANDARDS.
A. SUMMARY
1. THIS SECTION INCLUDES PLUMBING PIPING SYSTEMS AS SHOWN ON DWGS. AND CONNECTING INTO SYSTEMS AS REQUIRED. SYSTEMS INCLUDE THE FOLLOWING:
a. POTABLE WATER DISTRIBUTION, INCLUDING COLD AND HOT WATER SUPPLY.
b. DRAINAGE AND VENT SYSTEMS, INCLUDING SANITARY AND STORM.
PART 2 PRODUCTS
A. DOMESTIC WATER PIPING SYSTEMS
1. ALL ABOVE-GROUND PIPING SHALL BE TYPE "L" HARD DRAWN COPPER WITH WROUGHT COPPER FITTINGS.
2. SWEAT COPPER JOINTS WITH 95% TIN-ANTIMONY SOLDER FOR ABOVE GROUND PIPING.
B. SOIL, WASTE, AND VENT PIPING
1. PIPE AND FITTINGS
a. ABS (ASTM D2681) OR PVC (ASTM D2685) PLASTIC PIPE & FITTINGS. PROVIDE APPROVED CLEANER & GLUE FOR ABS OR PVC FITTINGS.
b. VENT PIPING SHALL BE TYPE "L" HARD COPPER WITH WROUGHT COPPER FITTINGS OR STEEL PIPING WITH NO HUB CONNECTIONS WHERE RETURN AIR PLENUM IS UTILIZED.
PART 3 EXECUTION
A. VALVES
1. SECTIONAL VALVES: INSTALL SECTIONAL VALVES CLOSE TO MAIN ON EACH BRANCH OR EQUIPMENT CONNECTIONS AND WHERE INDICATED. USE BALL VALVES FOR SECTIONAL VALVES 2 INCHES AND SMALLER.
2. SHUTOFF VALVES: INSTALL SHUTOFF VALVES ON INLET TO EACH PLUMBING EQUIPMENT ITEM, ON EACH SUPPLY TO EACH PLUMBING FIXTURE NOT HAVING STOPS ON SUPPLIES, AND ELSEWHERE AS INDICATED. FOR SHUTOFF VALVES 2 INCHES AND SMALLER, USE BALL VALVES.
B. CONNECTIONS
1. SUPPLY RUNOUTS TO FIXTURES: INSTALL HOT AND COLD WATER SUPPLY PIPING RUNOUTS OF SIZES INDICATED, BUT NOT SMALLER THAN REQUIRED BY PLUMBING CODE TO FIXTURES.
2. DRAINAGE RUNOUTS TO FIXTURES: PROVIDE DRAINAGE AND VENT PIPING RUNOUTS, WITH APPROVED TRAP, OF SIZES INDICATED, BUT NOT SMALLER THAN REQUIRED BY PLUMBING CODE, TO PLUMBING FIXTURES AND DRAINS.
C. FIELD QUALITY CONTROL
1. INSPECT WATER DISTRIBUTION PIPING AND DRAINAGE PIPING.
a. DO NOT ENCLOSE, COVER OR PUT INTO OPERATION WATER DISTRIBUTION PIPING SYSTEM UNTIL IT HAS BEEN INSPECTED AND APPROVED BY THE AUTHORITY HAVING JURISDICTION.
2. TEST WATER DISTRIBUTION PIPING AS FOLLOWS:
a. TEST FOR LEAKS AND DEFECTS IN NEW WATER DISTRIBUTION PIPING SYSTEM.
b. CAP AND SUBJECT THE PIPING SYSTEM TO A STATIC WATER PRESSURE TWICE THE OPERATING PRESSURE WITHOUT EXCEEDING PRESSURE RATING OF PIPING SYSTEM MATERIALS.

PART 3 EXECUTION

- 1. INSTALL UNITS ON ROOF CURBS WITH 3/4" X 1-3/4" WIDE GASKETING

- ISOLATE TEST SOURCE AND ALLOW TO STAND FOR 4 HOURS. LEAKS AND LOSS IN TEST PRESSURE CONSTITUTE DEFECTS THAT MUST BE REPAIRED.
c. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST SYSTEM OR PORTION THEREOF UNTIL SATISFACTORY RESULTS ARE OBTAINED.
3. DRAINAGE AND VENT PIPING TEST:
a. TEST DRAINAGE AND VENT SYSTEM ACCORDING TO PROCEDURES OF AUTHORITY HAVING JURISDICTION.

END OF SECTION

SECTION 154400 - PLUMBING FIXTURES

- PART 1 GENERAL
1. PROVIDE PLUMBING FIXTURES AND TRIM, FITTINGS, OTHER COMPONENTS AND SUPPORTS AS SPECIFIED ON THE DRAWINGS IN THE PLUMBING FIXTURE SCHEDULE.
2. FAUCETS, UNLESS OTHERWISE SPECIFIED, PROVIDE FAUCETS THAT ARE CAST BRASS WITH POLISHED CHROME-PLATED FINISH.
3. FURNISH WALL CARRIERS FOR THE FOLLOWING FIXTURES:
a. WALL HUNG LAVATORIES AND SINKS
PART 2 PRODUCTS
1. ORDER PRODUCTS AS INDICATED ON DRAWINGS.
2. INSPECT EACH INSTALLED FIXTURE FOR DAMAGE. REPLACE DAMAGED FIXTURES AND COMPONENTS.
3. SUBMIT SHOP DRAWINGS TO DESIGNER FOR SUBSTITUTION APPROVAL.
PART 3 EXECUTION
1. OPERATE AND ADJUST FAUCETS AND CONTROLS. REPLACE DAMAGED AND MALFUNCTIONING FIXTURES, FITTINGS, AND CONTROLS.
2. ADJUST WATER PRESSURE AT FAUCETS, AND FLOUSHMETERS HAVING CONTROLS, TO PROVIDE PROPER FLOW AND STREAM.
3. REPLACE WASHERS OF LEAKING AND DRIPPING FAUCETS AND STOPS.
4. CLEAN FIXTURES, FITTINGS, AND SPOUT AND DRAIN STRAINERS WITH MANUFACTURERS' RECOMMENDED CLEANING METHODS AND MATERIALS.
5. PROVIDE PROTECTIVE COVERING FOR INSTALLED FIXTURES AND FITTINGS.
6. DO NOT ALLOW USE OF FIXTURES AS TEMPORARY FACILITIES.

END OF SECTION

SECTION 154600 - PLUMBING EQUIPMENT

- PART 1 GENERAL
A. THIS SECTION INCLUDES DOMESTIC WATER HEATERS AND SMOKE DEVELOPED RATING INK MOUNTED GAS WATER HEATER.
2. SMALL ELECTRIC DOMESTIC WATER HEATER.
PART 2 PRODUCTS
A. TANKLESS RACK SYSTEM: NAVIEM MODEL NPE240A.
1. PROVIDE TANKLESS RACK SYSTEM OF SIZE, FLOW RATE AND TEMPERATURE RISE AS SPECIFIED ON THE DRAWINGS.
2. BE CONSTRUCTED OF MARINE GRADE POWDER COATED ALUMINUM.
3. WATER AND GAS PIPING MANIFOLD ASSEMBLED AT MANUFACTURERS' FACTORY AND DELIVERED TO THE JOBSITE SUCH THAT ONLY FINAL CONNECTIONS ARE REQUIRED ON SITE.
4. UNITS' WATER TRUNK LINES ARE CONSTRUCTED OF TWO (2) 2-1/2" DIAMETER RIGID COPPER. UNITS' GAS LINE IS 1-1/4" - 1-1/2" DIA NPT POWDER COATED SCHEDULE 40 STEEL. SPECIFY SIZE WHEN ORDERING.
5. CONCENTRIC VENTING SYSTEM IS PROVIDED BY THE MANUFACTURER AND SHIPPED LOOSE TO BE INSTALLED BY THE CONTRACTOR ON SITE. SPECIFY LENGTH WHEN ORDERING.
6. APPROVED ALTERNATE MANUFACTURERS
6.1. RINNAI MODEL: C199I
6.2. AO SMITH MODEL: AT1-CRS2WN-N
6.3. STATE MODEL: GTS-CRS-2WM-MI
B. INSTANT HOT WATER HEATER
1. STORES WITH ONLY PET WASH PROVIDE TANKLESS WATER HEATER BELOW LAVATORY IN RESTROOMS.
PART 3 EXECUTION - NOT USED
END OF SECTION

SECTION 154900 - NATURAL GAS SYSTEMS

- PART 1 GENERAL
1. FURNISH AND INSTALL GAS PIPING AS SHOWN ON DRAWINGS, AND IN COMPLIANCE WITH THE APPLICABLE FUEL GAS CODE.
2. PURCHASE GAS METER (IF REQUIRED) IN COMPLIANCE WITH GAS COMPANY'S STANDARDS. LOCATE AS SHOWN ON DWGS.
PART 2 PRODUCTS
1. PIPING SHALL BE ASTM A53, SCHEDULE 40 BLACK STEEL PIPE. PROVIDE THREADED PIPE FOR 2" AND UNDER PIPING, PROVIDE PLAIN END PIPE FOR 2-1/2" AND OVER PIPING.
2. FITTINGS SHALL BE 150# MALLEABLE IRON FOR 2" AND UNDER. FITTINGS SHALL BE ASTM A 234 BUTT WELD FOR 2-1/2" AND OVER.
3. USE AN APPROVED PIPE DOPE AT CONNECTIONS.
4. PROVIDE A DRIP LEG, GAS COCK, AND UNION WITHIN 72 INCHES OF EACH CONNECTION TO EQUIPMENT.
B. VALVES - SEE SECTION 150500
PART 3 EXECUTION
1. COMPLY WITH FUEL GAS CODE FOR GAS PIPING MATERIALS AND COMPONENTS, INSTALLATIONS, AND INSPECTION TESTING AND PURGING.
2. LISTING AND LABELING: PROVIDE EQUIPMENT AND ACCESSORIES THAT ARE LISTED AND LABELED.
A. FIELD QUALITY CONTROL
1. INSPECT, LEAK TEST, AND PURGE NATURAL GAS SYSTEMS ACCORDING TO LOCAL GAS COMPANY STANDARDS.
2. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS, AND RETEST SYSTEM UNTIL SATISFACTORY RESULTS ARE OBTAINED.
3. REPORT TEST RESULTS PROMPTLY AND IN WRITING TO THE ARCHITECT AND THE AUTHORITY HAVING JURISDICTION.
4. VERIFY CAPACITIES AND PRESSURE RATINGS OF GAS METERS, REGULATORS, VALVES, AND SPECIALTIES.
5. VERIFY CORRECT PRESSURE SETTINGS FOR PRESSURE REGULATORS.
6. VERIFY THAT SPECIFIED PIPING TESTS ARE COMPLETE.
7. INSTALL SHUT-OFF VALVE, UPSTREAM FROM GAS METER, OUTSIDE BUILDING AT GAS SERVICE ENTRANCE.
END OF SECTION

SECTION 156000 - ROOFTOP HEATING AND COOLING UNITS

- PART 1 GENERAL
1. INSTALL ROOFTOP HEATING AND COOLING UNITS AS SCHEDULED ON THE DRAWINGS. UNITS SHALL BE RATED BY ARI STANDARD 240 FOR CAPACITY AND ARI STANDARD 270 FOR SOUND. UNITS SHALL BE DESIGNED, MANUFACTURED AND TESTED IN ACCORDANCE WITH UL REQUIREMENTS AND HAVE THE UL LABEL. UNITS SHALL CARRY A 5-YEAR WARRANTY ON COMPRESSORS, A 10-YEAR WARRANTY ON HEAT EXCHANGERS, AND A 1-YEAR WARRANTY ON ALL OTHER PARTS.
PART 2 PRODUCTS
1. EQUIPMENT SHALL BE YORK MANUFACTURED BY JOHNSON CONTROLS - NO EXCEPTIONS. UNITS SHALL BE COMPLETELY FACTORY ASSEMBLED AND TESTED. UNITS SHALL INCLUDE THE FOLLOWING: CONDENSER FANS, COILS AND MOTOR, INTERCONNECTING WIRING AND CONTROL PANEL.
2. FACTORY-INSTALLED OPTIONS SHALL INCLUDE INTELLISPEED VARIABLE FREQUENCY DRIVE (VFD), INTELLISPEED CONTROL OF THE VFD BASED ON STAGES OF COOLING (PROVIDES SINGLE ZONE VAV FAN OPERATION AS DEFINED BY ASHRAE 90.1 SECTION 6.4.3.10), DRY BULB LOW LEAK ECONOMIZER W/BAROMETRIC RELIEF AND WITH ECONOMIZER FAULT DETECTION & DIAGNOSTIC (MEETS ASHRAE 90.1-2013, IECC 2015, CALIFORNIA TITLE 24, AMCA 511), 3 HP HIGH STATIC BELT DRIVE BLOWER, STANDARD 2" THROWAWAY FILTERS, SIMPLICITY SE CONTROLLER INCLUDING DISCHARGE AIR, RETURN AIR, AND OUTDOOR AIR TEMPERATURE SENSORS, POWERED CONVENIENCE OUTLET (110 VAC / 15 AMP), HACR CIRCUIT BREAKER/DISCONNECT, RETURN AIR SMOKE DETECTOR (BOTTOM RETURN ONLY), PHASE MONITOR, MICRO-CHANNEL "ALL-ALUMINUM" CONDENSER COIL, COPPER TUBE/ALUMINUM FIN EVAPORATOR COIL, AND COMPOSITE DRAIN PAN.
3. FIELD-INSTALLED ACCESSORIES SHALL INCLUDE 14" HIGH ROOF CURB, CO2 SPACE/WALL MOUNT SENSOR, AND YORK PROGRAMMABLE THERMOSTAT.
PART 3 EXECUTION
1. INSTALL UNITS ON ROOF CURBS WITH 3/4" X 1-3/4" WIDE GASKETING

END OF SECTION

SECTION 159900 - TESTING, ADJUSTING, AND BALANCING

- PART 1 GENERAL
A. GENERAL
1. FURNISH TESTING, BALANCING, AND ADJUSTING OF HEATING, COOLING AND EXHAUST SYSTEMS. TESTING AGENCY SHALL HAVE FIVE YEARS EXPERIENCE WITH PROJECTS OF SIMILAR SIZE AND SCOPE.
2. SUBMIT FOUR COPIES OF COMPLETE TEST DATA FOR EVALUATION AND APPROVAL. SUBMIT FORMS PREPARED BY AABC.
3. TEST, ADJUST, AND BALANCE THE AIR CONDITIONING SYSTEM DURING THE SUMMER SEASON AND HEATING SYSTEM DURING THE WINTER SEASON.
4. HVAC CONTRACTOR TO PERFORM COMPLETE TEST AND BALANCE ON NEW OR UPDATED HVAC SYSTEM AND SUBMIT TO GC AND BUILDING OFFICIAL IF REQUIRED.
PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION
1. PERFORM TESTING AND BALANCING IN COMPLETE ACCORDANCE WITH THE ASSOCIATED AIR BALANCE COUNCIL "STANDARDS FOR FIELD MEASUREMENTS AND INSTRUCTIONS."
2. INSTRUMENTS USED BY AGENCY SHALL BE ACCURATELY CALIBRATED AND MAINTAINED IN GOOD WORKING ORDER.
3. AIR TESTING AND BALANCING PROCEDURE
a. CHECK FILTERS. DO NOT PROCEED WITHOUT CORRECT, CLEAN FILTERS.
b. TEST AND ADJUST BLOWER RPM TO DESIGN REQUIREMENTS.
c. TEST AND RECORD MOTOR FULL LOAD AMPS.
d. TEST AND RECORD SUPPLY AIR, RETURN AIR AND EXHAUST AIR CFM, STATIC PRESSURES, STOP AND DISCHARGE.
e. TEST AND RECORD ENTERING AND LEAVING AIR TEMPERATURES, BOTH HEATING AND COOLING.
f. TEST AND ADJUST EACH DIFFUSER, GRILLE, AND REGISTER TO WITHIN 10% OF DESIGN REQUIREMENTS. IDENTIFY EACH DIFFUSER, GRILLE, AND REGISTER BY MANUFACTURER, TYPE, SIZE, AND COMPARISON BETWEEN REQUIRED CFM AND TESTED.
B. REPORT IS PART OF THE REQUIRED CLOSEOUT PACKAGE AND MUST BE POSTED TO NATIONAL ACCOUNT VENDOR.
END OF SECTION

SECTION 159990 - FIRE SUPPRESSION

- PART 1 GENERAL
1. FIRE PROTECTION DESIGN, CONSTRUCTION DRAWINGS HYDRONIC CALCULATIONS AND FLOW RATES SHALL BE PREPARED BY A CERTIFIED FIRE PROTECTION ENGINEER.
2. QUALITY STANDARD: NFPA 13 AND NFPA 70
3. OBSERVE ALL LANDLORD FIRE PROTECTION REQUIREMENTS. LANDLORD REQUIREMENTS SHALL SUPERCEDE ANY LISTED IN THIS SPECIFICATION.
PART 2 PRODUCTS
1. PIPING BETWEEN FIRE-DEPARTMENT CONNECTION AND CHECK VALVES: STANDARD-WEIGHT STEEL PIPE WITH GROOVED-END OR THREADED END

MATERIAL SUPPLIED BY UNIT MANUFACTURER.
END OF SECTION

SECTION 158000 - POWER VENTILATORS

- PART 1 GENERAL
1. INSTALL YORK (PENNBARRY) VENTILATORS AS DESCRIBED IN CONTRACT DRAWINGS.
PART 2 PRODUCTS
1. AS SCHEDULED ON DRAWINGS, OTHER APPROVED MANUFACTURERS INCLUDE BROAN, CARNES, GREENHECK, AND PENN.
2. CEILING MOUNTED EXHAUST FANS SHALL BE ACOUSTICALLY INSULATED WITH 1/2" SOUND LEVEL. RATING OF 4.6 SONES MAXIMUM. PROVIDE EXHAUST GRILLE, SHATTERPROOF BACK DRAFT DAMPER, ROOF CAP AND RUBBER - IN SHEAR VIBRATION ISOLATORS.
PART 3 EXECUTION
1. INSTALL FANS LEVEL AND PLUMB, IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. SECURE UNITS TO STRUCTURE OR CURB.
2. CHECK EXHAUST FANS FOR ANYTHING THAT WILL AFFECT ITS OPERATION AND TAKE CORRECTIVE ACTION BEFORE START-UP.
END OF SECTION

SECTION 158000 - METAL DUCTWORK

- PART 1 GENERAL
1. FURNISH AND INSTALL RECTANGULAR AND ROUND METAL DUCTS AND PLenums FOR HVAC SYSTEMS PER THE CONTRACT DOCUMENTS.
2. FURNISH AND INSTALL DUCT LINER IN ALL RETURN AIR DUCTWORK. MAINTAIN AIR WAY DIMENSIONS ON DRAWINGS.
3. COMPLY WITH NFPA 90A, "STANDARD FOR THE INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEM."
PART 2 PRODUCTS
1. FABRICATE DUCTS OF LOCK FORMING QUALITY, ASTM A 527, COATING DESIGNATION 690, IN CONFORMANCE WITH ALL "SMACNA" STANDARDS. PROVIDE MILL PHOSPHATIZED FINISH FOR EXPOSED SURFACES OF DUCTS EXPOSED TO VIEW. SEAL JOINTS AND SEAMS WITH UNITED DUCT SEAL OR EQUAL.
2. SEE SECTION 152500 FOR DUCT LINER SPECIFICATION.
3. VOLUME DAMPERS IN MAIN AND BRANCH DUCTS SHALL BE FACTORY FABRICATED MULTIPLE OPPOSED BLADE DESIGN WITH STANDARD LEAKAGE RATING, LOCKING QUADRANT AS MANUFACTURED BY AIR CONTROL PRODUCTS TCD-08 OR EQUAL.
4. FIRE DAMPERS SHALL BE "RUSKIN" ID2 TYPE B, 165°F FUSIBLE LINK, 1 1/2" HOUR RATED, UNLESS OTHERWISE NOTED ON THE DRAWINGS OR AS REQUIRED BY LOCAL BUILDING CODE. REGULATIONS.
5. DUCT HANGERS SHALL BE 1" X 18 GA. GALV. STEEL STRAPS SPACED NOT MORE THAN 8 FT. APART.
6. PROVIDE TURNING VANES IN ALL S.A. AND R.A. ELBOWS. TURNING VANES SHALL BE SINGLE BLADE VANES WITH TRAILING EDGE, 1-1/4" WIDE VANE RAIL.
7. FLEXIBLE DUCTS SHALL COMPLY WITH UL 181, CLASS I, FACTORY-FABRICATED, INSULATED RIGID DUCT WITH AN OUTER GLASS-REINFORCED SILVER MYLAR JACKET ENCLOSING 1-1/2" THICK GLASS FIBER INSULATION AROUND A CONTINUOUS INNER LINER. REINFORCEMENT SHALL BE A STEEL-WIRE HELIX ENCAPSULATED IN THE POLYETHYLENE FILM INNER LINER.
8. MAXIMUM FLEXIBLE DUCT RUN TO BE 5'-0".
PART 3 EXECUTION
1. CONSTRUCT AND INSTALL EACH DUCT SYSTEM FOR THE SPECIFIC DUCT PRESSURE CLASSIFICATION INDICATED PER SMACNA AND LOCAL CODE. INSTALL DUCTS CLOSE TO WALLS, OVERHEAD CONSTRUCTION, COLUMNS, AND OTHER PERMANENT ELEMENTS OF THE BUILDING.
2. ADJUST VOLUME CONTROL DAMPERS AS REQUIRED BY THE TESTING AND BALANCING PROCEDURES. VACUUM DUCT SYSTEMS PRIOR TO FINAL ACCEPTANCE.
3. ALL SUPPORTS FOR FLEXIBLE DUCT SHALL INCORPORATE A 1" WIDE BAND CLAMP. SUPPORT SYSTEM MUST NOT DAMAGE NEW DUCT OR CAUSE OUT OF ROUND SHAPE. MAXIMUM LENGTH OF FLEXIBLE DUCTS SHALL BE 5'-0".
4. INSTALL ONLY RIGID METAL DUCTWORK WHERE IT IS EXPOSED TO VIEW.
END OF SECTION

SECTION 159500 - AIR OUTLETS AND INLETS

- PART 1 GENERAL
1. INSTALL TUTTLE AND BAILEY CEILING AIR DIFFUSERS AND GRILLES AS DESCRIBED IN CONTRACT DOCUMENTS. AIR OUTLETS AND INLETS SHALL COMPLY WITH ARI 650 STANDARD.
PART 2 PRODUCTS
1. AS SCHEDULED ON DRAWINGS, OTHER APPROVED MANUFACTURERS INCLUDE: ANEMOSTALL, CARNES, KRUEGER, TUTTLE AND BAILEY.
2. ALL DIFFUSERS SHALL HAVE BORDER STYLES COMPATIBLE WITH ADJACENT CEILING SYSTEMS.
3. REGISTERS, DIFFUSERS, AND GRILLES SHALL HAVE A SEMI-GLOSS WHITE GARDOL FACTORY FINISH UNLESS NOTED OTHERWISE.
PART 3 EXECUTION
1. INSTALL AIR OUTLETS AND INLETS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. COORDINATE LOCATION OF CEILING DIFFUSERS AND GRILLES WITH THE REFLECTED CEILING PLAN. ANCHOR SECURELY INTO OPENINGS.
2. CONTRACTOR SHALL INSTALL MERV-8 FILTER ON RETURN AIR INLET DURING CONSTRUCTION PERIOD. FILTER SHALL BE CHANGED WEEKLY DURING CONSTRUCTION.
END OF SECTION

SECTION 159900 - TESTING, ADJUSTING, AND BALANCING

- PART 1 GENERAL
A. GENERAL
1. FURNISH TESTING, BALANCING, AND ADJUSTING OF HEATING, COOLING AND EXHAUST SYSTEMS. TESTING AGENCY SHALL HAVE FIVE YEARS EXPERIENCE WITH PROJECTS OF SIMILAR SIZE AND SCOPE.
2. SUBMIT FOUR COPIES OF COMPLETE TEST DATA FOR EVALUATION AND APPROVAL. SUBMIT FORMS PREPARED BY AABC.
3. TEST, ADJUST, AND BALANCE THE AIR CONDITIONING SYSTEM DURING THE SUMMER SEASON AND HEATING SYSTEM DURING THE WINTER SEASON.
4. HVAC CONTRACTOR TO PERFORM COMPLETE TEST AND BALANCE ON NEW OR UPDATED HVAC SYSTEM AND SUBMIT TO GC AND BUILDING OFFICIAL IF REQUIRED.
PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION
1. PERFORM TESTING AND BALANCING IN COMPLETE ACCORDANCE WITH THE ASSOCIATED AIR BALANCE COUNCIL "STANDARDS FOR FIELD MEASUREMENTS AND INSTRUCTIONS."
2. INSTRUMENTS USED BY AGENCY SHALL BE ACCURATELY CALIBRATED AND MAINTAINED IN GOOD WORKING ORDER.
3. AIR TESTING AND BALANCING PROCEDURE
a. CHECK FILTERS. DO NOT PROCEED WITHOUT CORRECT, CLEAN FILTERS.
b. TEST AND ADJUST BLOWER RPM TO DESIGN REQUIREMENTS.
c. TEST AND RECORD MOTOR FULL LOAD AMPS.
d. TEST AND RECORD SUPPLY AIR, RETURN AIR AND EXHAUST AIR CFM, STATIC PRESSURES, STOP AND DISCHARGE.
e. TEST AND RECORD ENTERING AND LEAVING AIR TEMPERATURES, BOTH HEATING AND COOLING.
f. TEST AND ADJUST EACH DIFFUSER, GRILLE, AND REGISTER TO WITHIN 10% OF DESIGN REQUIREMENTS. IDENTIFY EACH DIFFUSER, GRILLE, AND REGISTER BY MANUFACTURER, TYPE, SIZE, AND COMPARISON BETWEEN REQUIRED CFM AND TESTED.
B. REPORT IS PART OF THE REQUIRED CLOSEOUT PACKAGE AND MUST BE POSTED TO NATIONAL ACCOUNT VENDOR.
END OF SECTION

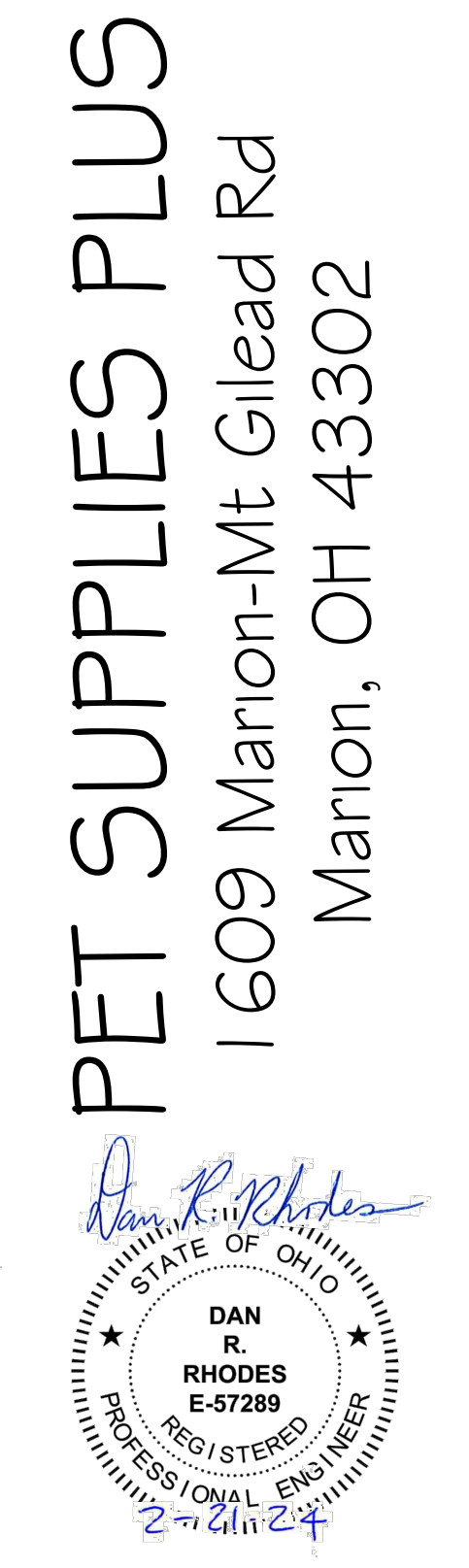
SECTION 159990 - FIRE SUPPRESSION

- PART 1 GENERAL
1. FIRE PROTECTION DESIGN, CONSTRUCTION DRAWINGS HYDRONIC CALCULATIONS AND FLOW RATES SHALL BE PREPARED BY A CERTIFIED FIRE PROTECTION ENGINEER.
2. QUALITY STANDARD: NFPA 13 AND NFPA 70
3. OBSERVE ALL LANDLORD FIRE PROTECTION REQUIREMENTS. LANDLORD REQUIREMENTS SHALL SUPERCEDE ANY LISTED IN THIS SPECIFICATION.
PART 2 PRODUCTS
1. PIPING BETWEEN FIRE-DEPARTMENT CONNECTION AND CHECK VALVES: STANDARD-WEIGHT STEEL PIPE WITH GROOVED-END OR THREADED END

- FITTINGS.
2. STANDARD-PRESSURE, WET-PIPE SPRINKLER SYSTEM NPS 2 AND SMALLER: STANDARD-WEIGHT OR SCHEDULE 30, BLACK-STEEL PIPE WITH THREADED OR GROOVED-END FITTINGS.
3. STANDARD-PRESSURE, WET-PIPE SPRINKLER SYSTEM NPS 2-1/2 AND LARGER: STANDARD-WEIGHT OR SCHEDULE 30, BLACK-STEEL PIPE WITH WELDED OR GROOVED-END FITTINGS.
4. STANDARD-PRESSURE, WET-PIPE SPRINKLER SYSTEM NPS 2-1/2 AND LARGER: STANDARD-WEIGHT OR SCHEDULE 10, BLACK-STEEL PIPE WITH WELDED FITTINGS.
5. SPRINKLER TYPES:
5.1. ROOMS WITHOUT CEILINGS: UPRIGHT SPRINKLERS
5.2. ROOMS WITH SUSPENDED OR HARD-LID CEILINGS: PENDENT SPRINKLERS
5.3. SPRINKLER SHALL BE APPROVED AUTOMATIC SPRAY SPRINKLERS TO COMPLY WITH NFPA 13. SPRINKLERS SHALL BE OF OPERATING TEMPERATURE AS REQUIRED BY NFPA AND THE FIRE MARSHALL'S OFFICE. PROVIDE ANTI-FREEZE LOOPS AT TOWERS. PROVIDE ANTI-FREEZE LOOP AT ENTRY VESTIBULE IN AREAS NORTH OF THE MASON DIXON LINE. VERIFY ALL FIRE MARSHALL REGULATIONS. PROVIDE APPROVED METAL CABINET WITH NUMBER OF REPLACEMENT HEADS OF VARIOUS TYPES AND QUANTITIES AS REQUIRED BY INSURING AGENCY.

- PART 3 EXECUTION
1. INSTALL PIPING FREE OF SAGS AND BENDS
2. INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS.
3. INSTALL SLEEVES FOR PIPES PASSING THROUGH CONCRETE AND MASONRY WALLS AND FLOORS.
4. EXTERIOR WALL, PIPE PENETRATIONS: MECHANICAL SLEEVE SEALS INSTALLED IN STEEL OR CAST-IRON PIPES FOR WALL SLEEVES.
5. INSTALL EQUIPMENT TO ALLOW MAXIMUM POSSIBLE HEADROOM UNLESS SPECIFIC MOUNTING HEIGHTS ARE INDICATED.
6. INSTALL EQUIPMENT LEVEL AND PLUMB, PARALLEL AND PERPENDICULAR TO OTHER BUILDING SYSTEMS AND COMPONENTS, UNLESS OTHERWISE INDICATED.
7. INSTALL CHECK VALVES WHERE INDICATED ON PLANS.
7.1 TESTING
a. TEST SYSTEM UNDER NORMAL OPERATION CONDITIONS AND DEMONSTRATE THAT PARTS ARE FUNCTIONING PROPERLY. CONDUCT TESTS AND SECURE FINAL CERTIFICATES OF APPROVAL. DELIVER COPIES OF CERTIFICATES TO ARCHITECT/ENGINEER AND LANDLORD.
b. TEST SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING: TWO-HOUR, 200 POUND HYDROSTATIC TEST ABOVE GROUND SYSTEM.
c. INCLUDE COST AND RUN SUCH TEST AS MAY BE NECESSARY TO DEMONSTRATE THAT EQUIPMENT EQUALS OR EXCEEDS CAPACITIES SPECIFIED UNDER REQUEST.
d. NOTIFY ARCHITECT/ENGINEER TWENTY-FOUR HOURS BEFORE TESTING.

END OF SECTION

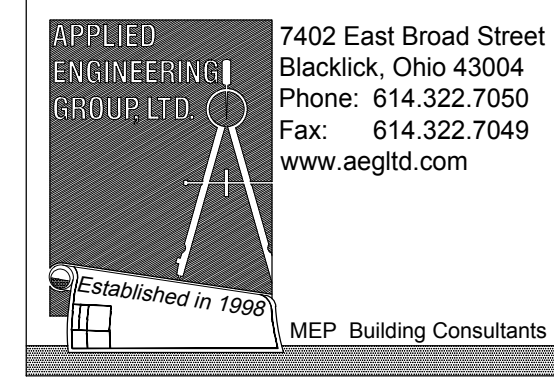


39 E. Main Street, Suite 101  
New Albany, Ohio 43054  
614-245-0275

SHEET TITLE  
MECHANICAL & PLUMBING SPECIFICATIONS

SHEET INFORMATION  
PROJECT NUMBER AEG #24026  
DRAWN BY  
CHECKED BY DCR  
SCALE AS NOTED  
ISSUE FOR PERMIT  
DATE 02-21-2024  
REVISIONS

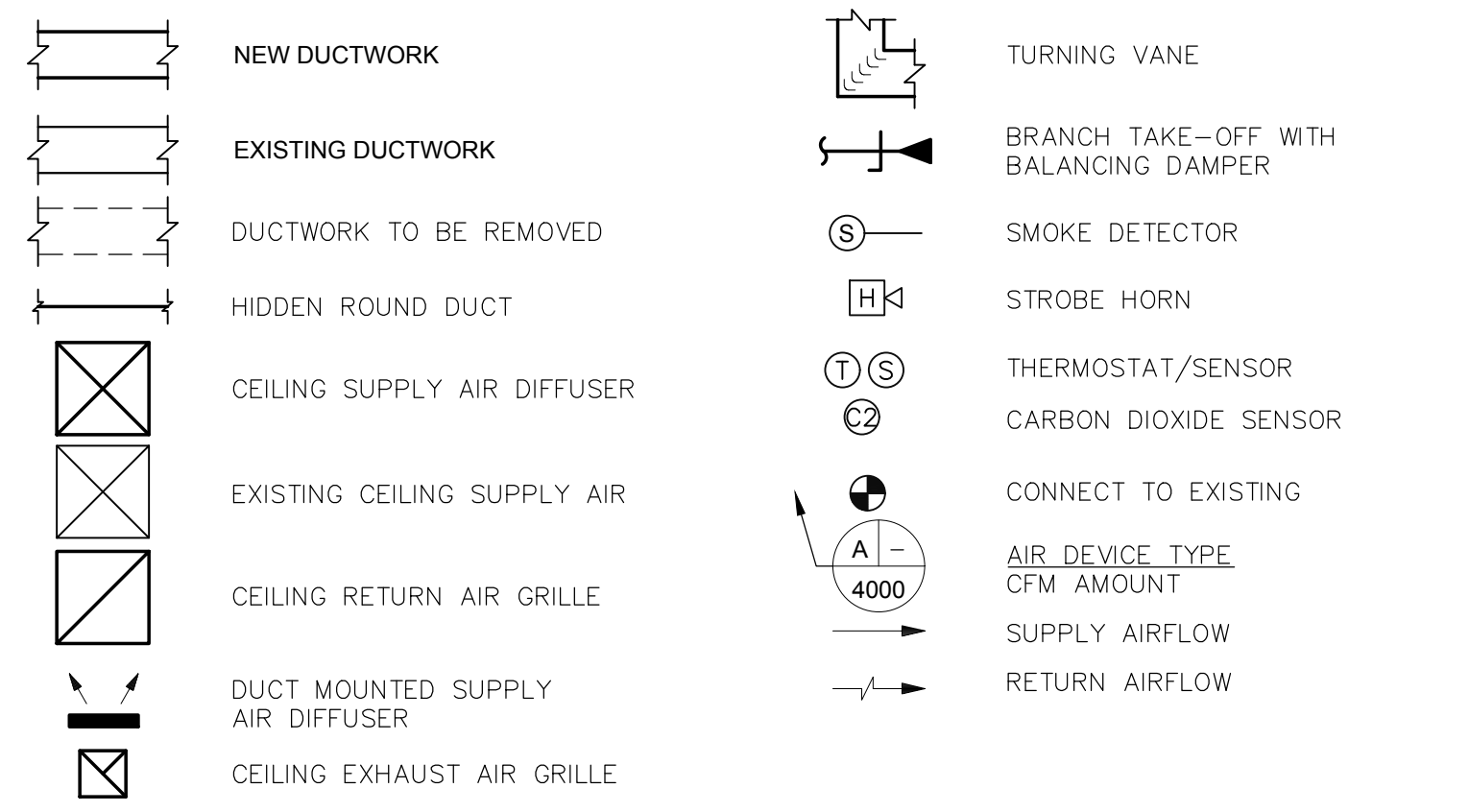
SHEET NUMBER



7402 East Broad Street  
Blacklick, Ohio 43004  
Phone: 614.322.7050  
Fax: 614.322.7049  
www.aegld.com

MPS 1.0

MECHANICAL SYMBOL LEGEND



\* ALL SYMBOLS MAY NOT BE USED

CODED NOTES (#)

- EXISTING ROOFTOP UNIT TO REMAIN AND BE REUSED. UNIT TO BE CLEANED, BEARINGS LUBRICATED, BELTS REPLACED, COILS STEAMED CLEANED, REFRIGERANT RECHARGED, REPLACE FILTERS AND ALL ITEMS REPLACED OR REPAIRED AS REQUIRED TO MAKE UNIT IN LIKE NEW CONDITION. BALANCE RTU CFM TO MATCH NOTES ON THE RTU SCHEDULE. SEE SCHEDULE ON SHEET M1.0 FOR MORE INFORMATION. FIELD VERIFY EXACT LOCATION OF UNIT. PROVIDE WITH BID ALTERNATE REPLACEMENT FOR RTU. SEE ALTERNATE RTU SCHEDULE ON SHEET M2.0 FOR MORE INFORMATION.
- FIELD VERIFY EXISTING SMOKE DETECTOR TO DE-ENERGIZE RTU SUPPLY FAN IF ACTIVATED. ENSURE SMOKE DETECTOR IS IN GOOD WORKING ORDER. REPAIR OR REPLACE AS REQUIRED. PROVIDE NEW STROBE HORN FOR RTU SMOKE DETECTOR. IF EXISTING SMOKE DETECTOR DOESN'T COMMUNICATE PROPERLY, PROVIDE NEW SMOKE DETECTOR. DEVICES TO BE INSTALLED AND WIRED BY MECHANICAL CONTRACTOR.
- CONTRACTOR TO PROVIDE AND INSTALL RAWAL DEVICES INC APR CONTROL VALVE FOR RTU. INSTALL PER MANUFACTURE RECOMMENDATIONS.
- GENERAL CONTRACTOR TO UNDERCUT DOOR 3/4" ABOVE THRESHOLD FOR TRANSFER AIR.
- EXISTING DUCT TO BE REMOVED
- EXISTING DUCTWORK TO REMAIN AND BE REUSED. CLEAN AND REPAIR AS NECESSARY TO MAKE LIKE NEW CONDITION.
- EXISTING EXHAUST FAN TO REMAIN AND BE REUSED. CLEAN AND REPAIR AS NECESSARY TO MAKE LIKE NEW CONDITION.
- PROVIDE AND INSTALL AN OPENING IN TOP OF RETURN AIR DUCT WITH 1/2" WIRE SCREEN MESH. OPENING TO BE SIZED AS NOTED.
- PROVIDE AND INSTALL A 7 DAY PROGRAMMABLE THERMOSTAT WITH COOLING STAGES AND HEATING STAGES TO MATCH UNIT. AUTO CHANGEOVER. OCCUPIED AND UNOCCUPIED MODES AND TEMPERATURE OVERRIDE WHILE OCCUPIED. MOUNT AT 4 FT. ABOVE FINISHED FLOOR IN LOCATION SHOWN ON PLAN. COORDINATE EXACT LOCATION WITH TENANT. THERMOSTAT MUST BE FULLY COMPATIBLE WITH HVAC UNIT USED FOR PROJECT. COORDINATE TYPE WITH UNIT MANUFACTURER.
- DUCT MOUNTED EXHAUST GRILLE SHALL BE CENTERED ABOVE SHELVING UNIT FOR FEEDER MICE.
- ROOF MOUNTED EXHAUST FAN. SEE DETAIL AND SCHEDULE FOR REQUIREMENTS.
- PROVIDE UNIT HEATER IN BACK ROOM. UNIT TO POINT AT OVER HEAD DOOR. ENSURE DOOR DOES NOT BLOCK UNIT WHEN OPEN. EXTEND FLUE THRU ROOF. EXTEND COMBUSTION AIR VENT THRU ROOF.
- MOUNT CARBON DIOXIDE SENSOR AT 5'-0" A.F.F. ONE SENSOR SHALL CONTROL OUTDOOR AIR FLOW FROM RTU-1 AND RTU-2.
- MOUNT AIR CURTAIN CENTERED ABOVE DOOR AT A MINIMUM OF 7'-6" A.F.F.

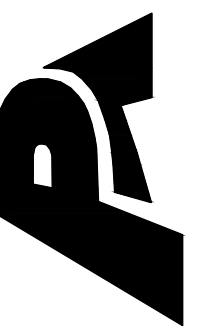
GENERAL NOTES

- CONTRACTOR SHALL VISIT SITE PRIOR TO BIDDING PROCESS AND BE FAMILIAR WITH THE SCOPE OF WORK.
- MECHANICAL CONTRACTOR SHALL DISCONNECT, DISASSEMBLE, AND REMOVE EXISTING EQUIPMENT, ASSOCIATED DUCTWORK, DIFFUSERS, GRILLES, SUPPORTS, PIPING, AND ASSOCIATED CONTROLS, ETC., NOT OTHERWISE INDICATED TO BE REUSED ON DRAWINGS. ALL OPENINGS IN PIPING AND DUCTS THAT REMAIN SHALL BE PLUGGED/CAPPED AND PROPERLY SECURED. ANY EQUIPMENT DESIGNATED BY OWNER TO BE SALVAGED SHALL BE PROTECTED DURING DEMOLITION AND DELIVERED TO OWNER ON SITE. OTHERWISE, CONTRACTOR SHALL DISPOSE OF LEGALLY AS DIRECTED BY OWNER.
- MECHANICAL CONTRACTOR SHALL TAKE ALL INTERFERENCES INTO CONSIDERATION. PROVIDE ALL NECESSARY OFFSETS OR TRANSITIONS WITH EQUIVALENT AREAS TO MATCH DUCT SIZES AS INDICATED ON DRAWINGS.
- CONTRACTOR SHALL BE FAMILIAR WITH OWNER'S STANDARDS, RULES AND REGULATIONS. ALL OWNER'S CRITERIA SHALL BE COMPLIED WITH AND INCLUDED IN THIS BID.
- ALL DUCTWORK SHALL BE INSTALLED TIGHT TO UNDERSIDE OF STRUCTURE OR AS HIGH AS POSSIBLE ABOVE FINISHED CEILING TO AVOID OBSTRUCTIONS.
- MAINTAIN ALL MANUFACTURER'S RECOMMENDED SERVICE CLEARANCES FOR ALL EQUIPMENT.
- HVAC DUCTWORK SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH ASHRAE AND LATEST SMACNA STANDARDS. PROVIDE TURNING VANES ON ALL ELBOWS.
- ALL SUPPLY AND EXHAUST BRANCH DUCTWORK SHALL HAVE MANUAL VOLUME DAMPERS IN CORRESPONDING RUNOUTS NEAR CONNECTION TO MAIN DUCT.
- NO THERMOSTATS OR SENSOR ARE TO BE LOCATED OVER HEAT PRODUCING EQUIPMENT.
- THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, LICENSES, DOCUMENTS AND SERVICES RELATED TO INSTALLATION OF WORK.
- CONDUIT IN EXPOSED TO VIEW AREAS TO BE PAINTED TO MATCH ROOF DECK AND/OR WALL COLOR.
- MECHANICAL CONTRACTOR SHALL PATCH ALL OPENINGS IN EXISTING WALLS, FLOORS, AND CEILINGS REMAINING AFTER COMPLETION OF ALL DEMOLITION WORK FOR PROJECT. CONTRACTOR SHALL PATCH ALL OPENINGS TO MATCH SURROUNDING SURFACE FINISHES.
- EXISTING SPRINKLERS TO BE MODIFIED AS REQUIRED TO ACCOMMODATE NEW ROOM/REFLECTED CEILING LAYOUT. SPRINKLERS SHALL BE IN ACCORDANCE WITH N.F.P.A. 13. PER REQUIRED OCCUPANCY HAZARDS.
- FILTERS FOR ALL HVAC UNITS ARE TO BE REPLACED AT THE END OF CONSTRUCTION. CONTRACTOR SHALL SUPPLY (1) ADDITIONAL SET OF FILTERS LABELED FOR THE RESPECTIVE HVAC UNIT TO OWNER AT THE END OF CONSTRUCTION.
- ALL ROOF WORK TO BE DONE BY LANDLORD APPROVED ROOFING CONTRACTOR TO MAINTAIN ROOF WARRANTY.
- ANY EXISTING CEILING ITEMS THAT ARE TO REMAIN (FOR EXAMPLE: EXISTING DUCTWORK OR ANY OTHER EXISTING BUILDING SYSTEM ELEMENTS) ARE TO BE RAISED AS REQUIRED FOR LIGHT FIXTURE INSTALLATION. G.C. TO COORDINATE AS REQUIRED.
- MECHANICAL CONTRACTOR TO PERFORM COMPLETE TEST AND BALANCE OF NEW OR UPDATED HVAC SYSTEM AND SUBMIT TO GC AND BUILDING OFFICIAL IF REQUIRED.
- ENERGY MANAGEMENT GATEWAY TO BE LOCATED IN THE IT RACK NEXT TO ETHERNET CONNECTION.

PET SUPPLIES PLUS  
1609 Marion-Mt Gilead Rd  
Marion, OH 43302



PONTIA  
ARCHITECTURE  
39 E. Main Street, Suite 101  
New Albany, Ohio 43054  
614-245-6273



SHEET TITLE

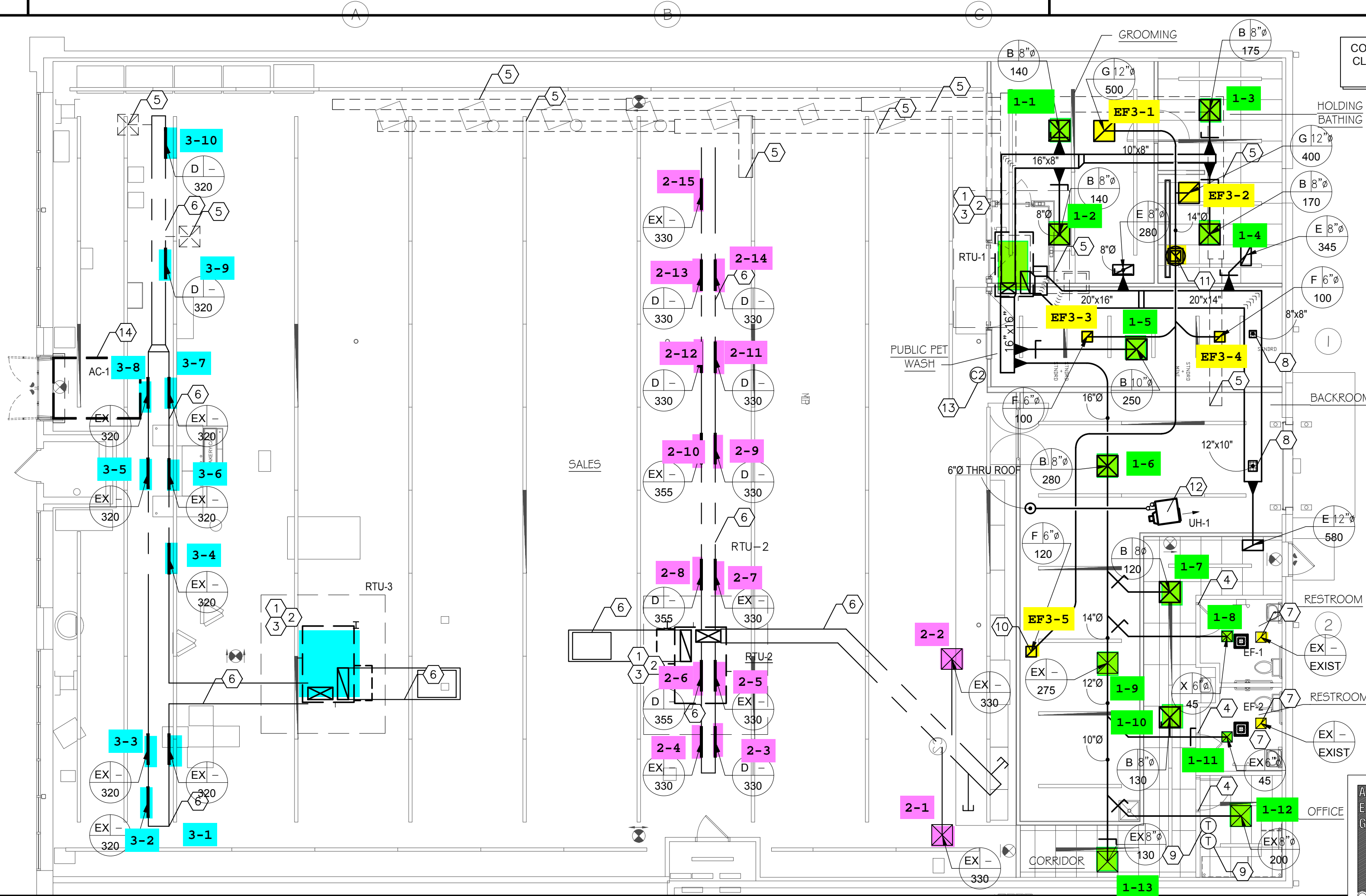
MECHANICAL PLAN

SHEET INFORMATION

PROJECT NUMBER AEG #24020  
DRAWN BY DG  
CHECKED BY DRR  
SCALE AS NOTED  
ISSUE FOR PERMIT  
DATE 02-21-2024  
REVISIONS

SHEET NUMBER

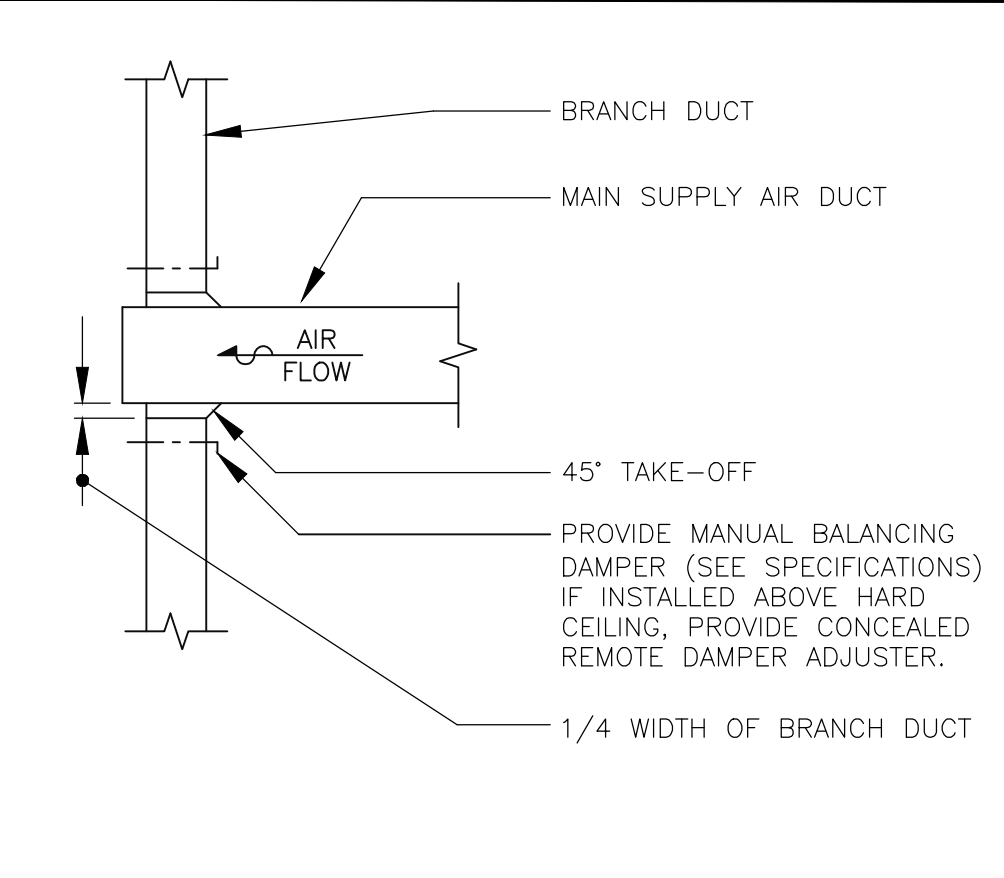
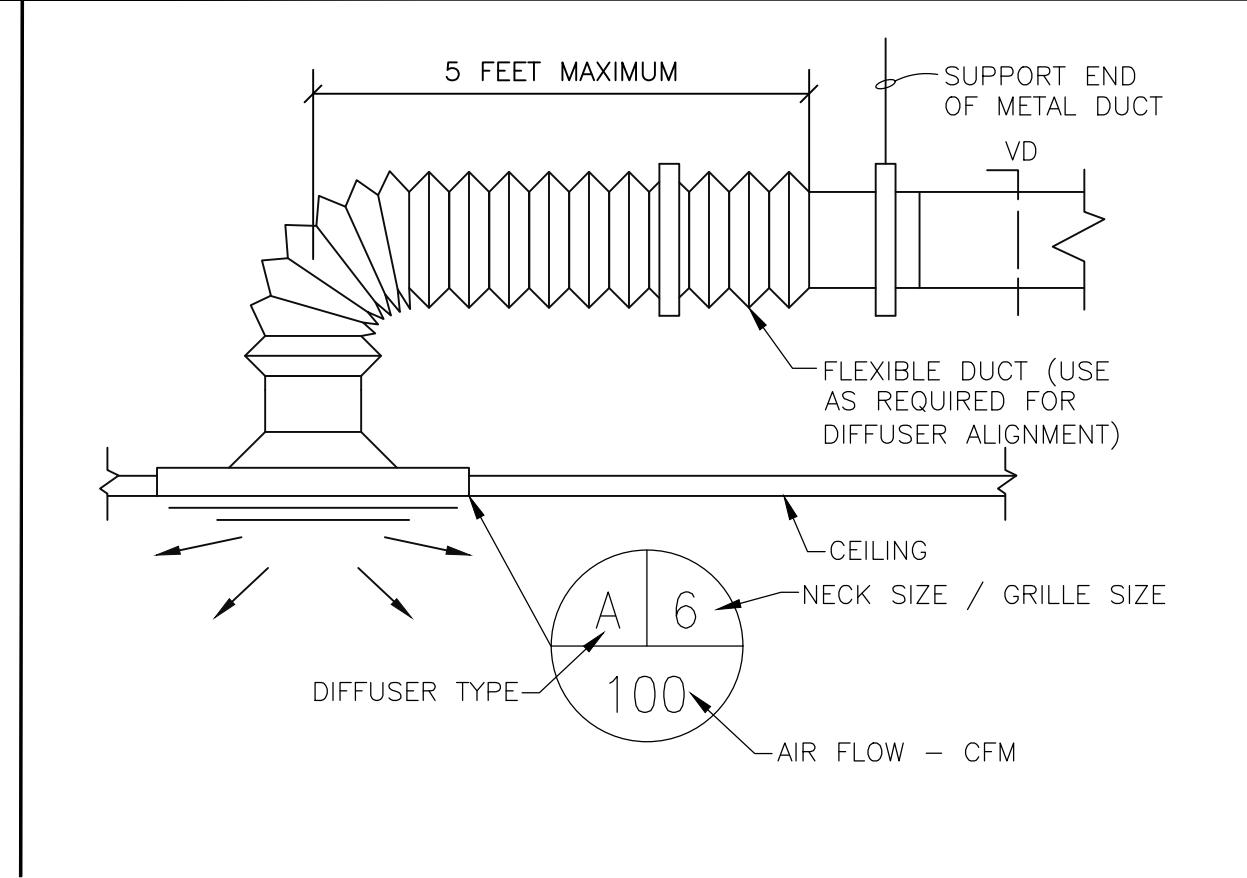
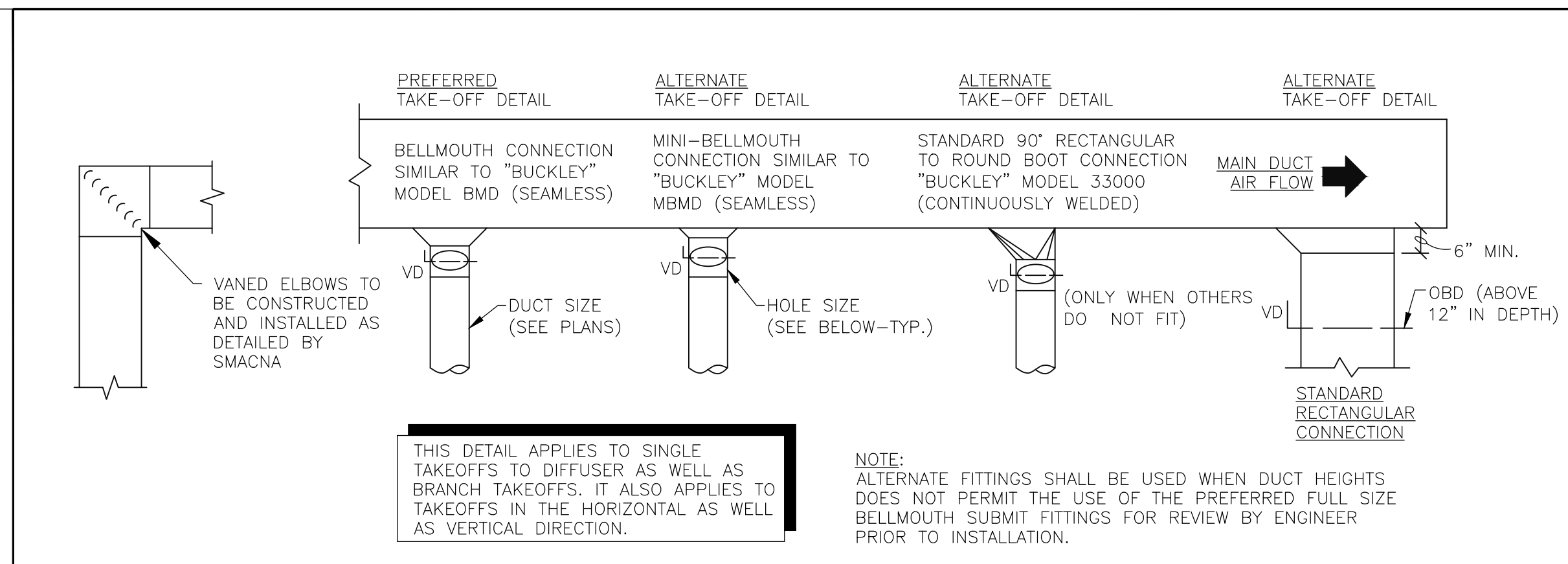
MI.O



CONTRACTOR MUST VERIFY ALL CLEARANCES AND DIMENSIONS IN FIELD

APPLIED ENGINEERING GROUP, LLC  
7402 East Broad Street  
Blacklick, Ohio 43004  
Phone: 614.322.7050  
Fax: 614.322.7049  
www.aegtd.com  
Established in 1968  
MEP Building Consultants

SCALE: 1/8" = 1'-0"



**MECHANICAL VENTILATION SCHEDULE**

ROOM NAME	OCCUPANCY CATEGORY	FLOOR AREA A <sub>z</sub> (FT <sup>2</sup> )	AREA OUTDOOR AIRFLOW RATE Ra (CFM/FT <sup>2</sup> )	PEOPLE OUTDOOR AIRFLOW RATE Rp (CFM/P)	OCCUPANT DENSITY (#/1000FT <sup>2</sup> )	PEOPLE P <sub>2</sub> (PEOPLE)	EFFECTIVE-NESS	REQUIRED OUTDOOR AIRFLOW Vbz (CFM)	EXHAUST RATE (CFM/FT <sup>2</sup> )	REQUIRED EXHAUST AIRFLOW (CFM)	ACTUAL PROVIDED OUTDOOR AIRFLOW (CFM)	ACTUAL PROVIDED EXHAUST AIRFLOW (CFM)	MECHANICAL UNIT
SALES	SALES	7,380	0.12	7.5	15	110	0.8	2,140	0	0	2150	0	RTU2, RTU-3
GROOMING	PET SHOPS	310	0.18	7.5	10	3	0.8	99	0.9	279	100	500	RTU-1, EF-3
GROOMING ENT.	OTHER	-	-	-	-	-	-	-	-	-	-	-	-
HOLDING	PET SHOPS	285	0.18	7.5	10	4	0.8	93	0.9	257	93	400	RTU-1, EF-3
PUB. PET WASH	PET SHOPS	290	0.18	7.5	10	4	0.8	94	0.9	261	95	200	RTU-1, EF-3
OFFICE	OFFICE SPACE	96	0.06	5	5	1	0.8	14	0	0	14	0	RTU-1
BACK ROOM	STORAGE	705	0.06	5	2	0	0.8	60	0	0	60	120	RTU-1, EF-3
CORRIDOR	CORRIDORS	302	0.06	0	0	0	0.8	23	0	0	23	0	RTU-1
MENS	PUBLIC TOILET	75	0	0	0	0	0.8	0	70 PER FIXTURE	70	0	70	RTU-1, EF-1
WOMENS	PUBLIC TOILET	75	0	0	0	0	0.8	0	70 PER FIXTURE	70	0	70	RTU-1, EF-2
<b>TOTAL</b>								<b>2,532</b>		<b>937</b>	<b>2,535</b>	<b>1,360</b>	

REMARKS:  
1. SALES AREA UTILIZES CO2 SENSING TO REDUCE OUTDOOR AIR REQUIREMENT. VALUE LISTED IS CODE REQUIRED MAXIMUM.

**EXISTING ROOFTOP UNIT SCHEDULE**

MARK	SERVICE	SUPPLY AIR (CFM)	O.A. (CFM)	E.S.P.	VOLTAGE / PHASE	MCA	MCOF	COOLING CAPACITY		HEATING CAPACITY		SEER/EER	MANUFACTURER & MODEL NO.	WEIGHT (LBS)	REMARKS
								TOTAL	SENSIBLE	MBH INPUT	MBH OUTPUT				
RTU-1	BACK OF HOUSE	2100	385	N/A	208V-3Ø	32	40	N/A	N/A	115	92	N/A	BRYANT 580FP072115	N/A	
RTU-2	SALES	5000	1200	N/A	208V-3Ø	56.2	70	N/A	N/A	250	200	N/A	BRYANT 580FPV151250AA	N/A	
RTU-3	SALES	4000	950	N/A	208V-3Ø	48.9	60	N/A	N/A	224	179	N/A	CARRIER 481E012	N/A	

REMARKS:  
1. PROVIDE WITH 14" HIGH ROOF CURB, INTELLISPEED VFD FOR UNITS 8.5 TONS AND OVER, ECONOMIZER, BAROMETRIC RELIEF, RETURN AIR SMOKE DETECTOR, DISCONNECT SWITCH, NON-POWERED CONVENIENCE OUTLET, PHASE MONITOR.  
2. STAGE GAS HEAT AND THRU THE CURB CONNECTION FOR GAS PIPING.  
3. PROVIDE WITH CO2 CONTROL FOR OUTDOOR AIR DURING OCCUPIED MODE WITH 1100 PPM MAX BUILD UP IN SPACE. ECONOMIZER SHALL MODULATE OPEN AS CO2 LEVELS RISE ABOVE 1100 PPM.

**GENERAL NOTES**

- A. PET SUPPLIES PLUS HAS A NATIONAL HVAC AGREEMENT WITH YORK INTERNATIONAL. THE HVAC MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND ACCEPTING THE EQUIPMENT, VERIFYING PROPER QUANTITIES, PROVIDING TEMPORARY STORAGE, LABOR, AND FIRST YEAR LABOR WARRANTY.
  - B. YORK NATIONAL ACCOUNTS WILL BE PROVIDING THE FOLLOWING EQUIPMENT:
    - 1. ALL ROOFTOP HVAC UNITS INCLUDING ALL ACCESSORIES.
    - a. FACTORY-INSTALLED INTELLISPEED VARIABLE FREQUENCY DRIVE (VFD)
    - b. FACTORY-INSTALLED ECONOMIZER WITH BAROMETRIC RELIEF
    - c. FACTORY-INSTALLED DISCONNECT SWITCH
    - d. FACTORY-INSTALLED NON-POWERED CONVENIENCE OUTLET
    - e. FACTORY-INSTALLED PHASE MONITOR
    - f. FACTORY-INSTALLED HIGH-STATIC DRIVE
    - g. FACTORY-INSTALLED RETURN AIR SMOKE DETECTOR
    - h. 2" STANDARD FILTERS
    - i. 14" HIGH ROOF CURB
    - j. CO2 SPACE/WALL MOUNT SENSOR
    - k. PROGRAMMABLE THERMOSTAT WITH WALL PLATE AND LOCKING COVER
  - 2. ALL GRILLES, REGISTERS AND DIFFUSERS AS SPECIFIED (GRDS) AND ALL CONCENTRIC DIFFUSERS AS SPECIFIED.
  - 3. ALL EXHAUST FANS AND REQUIRED ACCESSORIES
  - 4. ALL GAS UNIT HEATERS AND REQUIRED ACCESSORIES
  - 5. AIR CURTAIN AND REQUIRED ACCESSORIES
- ALL OTHER EQUIPMENT, ACCESSORIES, ETC. ARE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.

**GRILLE & DIFFUSER SCHEDULE**

MARK	MANUFACTURER & MODEL NO.	DAMPER NUMBER	FRAME/BORDER	CFM	MODULE SIZE	PATTERN	FINISH	REMARKS
A	RUSKIN ROOFTOP SYSTEMS 1-575-2010	-	DUCT MOUNT	AS NOTED	30"x30"	4-WAY/DRUM GRILL	WHITE	SUPPLY
B	TITUS TMS-AA	0BD	LAY-IN DUCT	AS NOTED	24"x24"	4-WAY	WHITE	SUPPLY
C	TITUS TMS-AA	0BD	SURFACE	AS NOTED	12"x12"	4-WAY	WHITE	SUPPLY
D	TITUS S300F	0BD	DUCT MOUNT	AS NOTED	22"x4"	DOUBLE DEFLECTION	WHITE	SUPPLY WITH O.B.D.
E	TITUS 350RL	-	LAY-IN WALL	AS NOTED	24"x12"	35° FIXED	WHITE	RETURN
F	TITUS 350RL	-	SURFACE/ DUCT	AS NOTED	12"x12"	35° FIXED	WHITE	EXHAUST
G	TITUS 350RL	-	SURFACE/ DUCT	AS NOTED	24"x24"	35° FIXED	WHITE	EXHAUST
H	TITUS 350RL	-	LAY-IN WALL	AS NOTED	12"x6"	35° FIXED	WHITE	EXHAUST
EX	EXISTING	-	EXISTING	AS NOTED	EXISTING	EXISTING	EXISTING	EXISTING

**EXHAUST FAN SCHEDULE**

NO.	SERVICE	CFM	S.P.	RPM/MOTOR HP	ELECT.	MANUF. & MODEL NO.	REMARKS
EF-1	MENS	70	N/A	EXISTING	120V - 1Ø	EXISTING	1
EF-2	WOMENS	70	N/A	EXISTING	120V - 1Ø	EXISTING	1
EF-3	PET AREAS	1220	0.35	1725/0.25	120V - 1Ø	YORK (PENNBARY) EVD16R	2

REMARKS:  
1. DISCONNECT SWITCH, GRAVITY BACKDRAFT DAMPER, FLEXIBLE DUCT COLLAR CONNECTION AND VIBRATION ISOLATION KIT.  
2. DISCONNECT SWITCH, GRAVITY BACKDRAFT DAMPER, ROOF CURB.

**GAS UNIT HEATER SCHEDULE**

NO.	SERVICE	GAS INPUT / GAS OUTPUT BTU/HR	ELECT.	MANUF. & MODEL NO.	REMARKS
UH-1	BACK ROOM	75,000 / 60,000	120V - 1Ø	STERLING S607SAINSA110-AS-G3-X	1 MOTOR: 1/2 HP, 0.06 KW, 2.6 AMPS

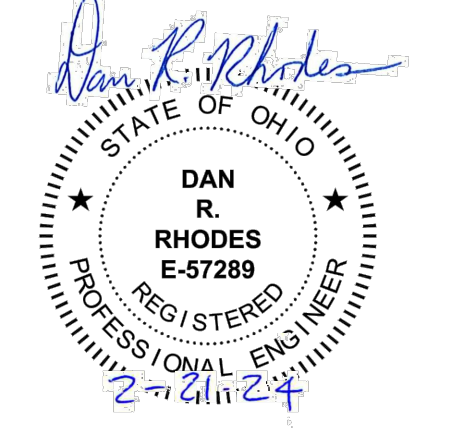
REMARKS:  
1. PROVIDE WITH DISCONNECT SWITCH, HANGER KIT WITH VIBRATION ISOLATION AND THERMOSTAT

**AIR CURTIAN SCHEDULE**

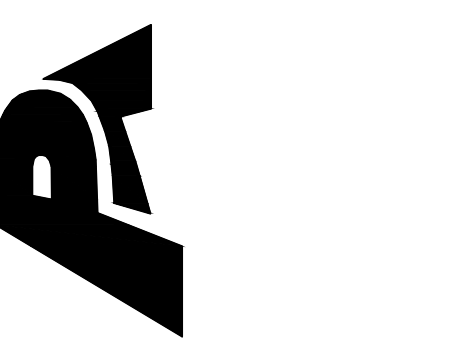
NO.	SERVICE	MAXIMUM VELOCITY AT NOZZLE (fpm)	ELECT.	MANUF. & MODEL NO.	REMARKS
AC-1	MAIN ENTRY	3,838	208V - 1Ø MCA=44.1, MCOF=60	BERNER AHD10-2 096 A	1,2

REMARKS:  
1. FACTORY INSTALLED FAN SWITCH  
2. PROVIDE WITH OPTIONAL WASHABLE FILTER

**PET SUPPLIES PLUS**  
1609 Marion-Mt Gilead Rd  
Marion, OH 43302



**PONTIA ARCHITECTURE**  
39 E. Main Street, Suite 101  
New Albany, Ohio 43054  
614-245-0275



SHEET TITLE

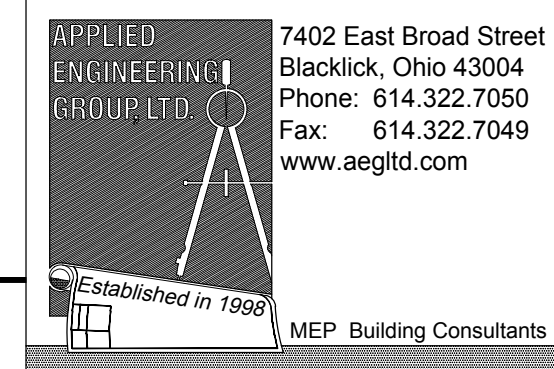
**MECHANICAL SCHEDULES**

SHEET INFORMATION

PROJECT NUMBER AEG #24020  
DRAWN BY DC  
CHECKED BY DRR  
SCALE AS NOTED  
ISSUE FOR PERMIT  
DATE 02-21-2024  
REVISIONS \_\_\_\_\_

SHEET NUMBER

**M2.0**



DIVISION 15 – MECHANICAL

SECTION 15000  
MECHANICAL GENERAL PROVISIONS

A. GENERAL CONDITIONS

- 1. DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND ALL OTHER SPECIFICATION SECTIONS ARE A PART OF THIS CONTRACT AND APPLY TO THIS AND THE OTHER SECTIONS OF DIVISION 15.
2. THE CONTRACTOR FOR THIS WORK IS REQUIRED TO READ THE ENTIRE SPECIFICATIONS AND REVIEW DRAWINGS FOR ALL OTHER TRADES.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING HIS SUBCONTRACTORS WITH A FULL SET OF BID SET DOCUMENTS (INCLUDING SPECIFICATIONS) AND THE COORDINATION OF HIS WORK AND INSPECTIONS AND THE WORK AND INSPECTIONS OF HIS SUBCONTRACTORS WITH ALL OTHER TRADES ON SITE CONFORMING TO THE GENERAL CONTRACTOR'S TIME SCHEDULE.
4. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING HIS BID TO DETERMINE CONDITIONS AFFECTING THE WORK. BIDS SHALL SERVE AS EVIDENCE OF KNOWLEDGE OF EXISTING CONDITIONS AND ANY MODIFICATIONS WHICH ARE REQUIRED TO MEET THE INTENT OF THE DRAWINGS AND SPECIFICATIONS. FAILURE TO VISIT THE SITE DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY IN PERFORMANCE OF WORK.
5. WHEN USED, THE TERM "PROVIDED BY CONTRACTOR" SHALL BE INTERPRETED AS MEANING "FURNISHED AND INSTALLED" WITH THE EXCEPTION WHERE ITEMS ARE "PROVIDED BY OWNER" WHICH MEANS "FURNISHED ONLY" (INSTALLED BY CONTRACTOR), EXCEPT AS SPECIFICALLY NOTED OTHERWISE.

B. GENERAL REQUIREMENTS

- 1. THE CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, SERVICES, TOOLS, TRANSPORTATION, INCIDENTALS AND DETAILS NECESSARY TO PROVIDE A COMPLETE AND FULLY FUNCTIONAL MECHANICAL SYSTEM AS SHOWN ON THE DRAWINGS, CALLED FOR IN THE SPECIFICATIONS, AND AS REQUIRED BY JOB CONDITIONS. FIELD VERIFY THE EXACT TYPE, SIZE AND LOCATION, ETC. OF EXISTING PIPE AND DUCTS IN THE OWNER SPACE PRIOR TO BID.
2. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO SUPPLEMENT EACH OTHER AND ANY MATERIAL OR LABOR CALLED FOR IN ONE SHALL BE PROVIDED EVEN THOUGH NOT SPECIFICALLY MENTIONED IN BOTH. ANY MATERIAL OR LABOR WHICH IS NEITHER SHOWN ON THE DRAWINGS NOR CALLED FOR IN THE SPECIFICATIONS, BUT WHICH IS OBVIOUSLY NECESSARY TO COMPLETE THE WORK, AND WHICH IS USUALLY INCLUDED IN WORK OF SIMILAR CHARACTER, SHALL BE PROVIDED AS PART OF CONTRACT.
3. WHERE THE DRAWINGS OR SPECIFICATIONS CALL FOR ITEMS WHICH EXCEED CODES OR THE OWNER CRITERIA, THE CONTRACTOR IS STILL RESPONSIBLE FOR PROVIDING THE SYSTEM AS DESIGNED AND DESCRIBED ON THESE DRAWINGS, UNLESS SPECIFICALLY NOTED OTHERWISE.
4. ALL MECHANICAL WORK SHALL BE INSTALLED SO AS TO BE READILY ACCESSIBLE FOR OPERATING, SERVICING, MAINTAINING, AND REPAIRING. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SUFFICIENT ACCESS TO ALL EQUIPMENT FOR SERVICE.
5. THE CONTRACTOR SHALL DO ALL CUTTING, CORE DRILLING, CHASING OR CHANNELING AND PATCHING REQUIRED FOR ANY WORK UNDER THIS DIVISION. CUTTING SHALL HAVE PRIOR APPROVAL BY THE OWNER'S CONSTRUCTION MANAGER. PATCHING SHALL MATCH FINISH OF SURROUNDING AREA.

C. CODES

- 1. ALL WORK SHALL BE PERFORMED IN A NEAT PROFESSIONAL MANNER USING GOOD ENGINEERING PRACTICES. ALL WORK SHALL CONFORM TO THE STATE'S, COUNTY'S, CITY'S AND LOCAL CODES AND ORDINANCES, SAFETY AND HEALTH CODES, NFPA CODES, ENERGY CODES AND ALL OTHER APPLICABLE CODES AND REQUIREMENTS. THE CONTRACTOR SHALL INQUIRE INTO AND COMPLY WITH ALL APPLICABLE CODES, ORDINANCES, AND REGULATIONS. AFTER CONTRACT IS ISSUED, NO ADDITIONAL COST DUE TO CODE ISSUES SHALL BE REBURSED BY THE OWNER TO THE CONTRACTOR.

D. LICENSES, PERMITS, INSPECTIONS & FEES

- 1. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL LICENSES, PERMITS, INSPECTIONS, AND FEES REQUIRED OR RELATED TO HIS WORK.
2. FURNISH TO THE OWNER'S CONSTRUCTION MANAGER ALL CERTIFICATES OF INSPECTION AND FINAL INSPECTION APPROVAL AT SUBSTANTIAL COMPLETION DATE OF PROJECT.

E. DRAWINGS

- 1. DRAWINGS (PLANS, SPECIFICATIONS, AND DETAILS) ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION AND INTENT OF THE MECHANICAL SYSTEMS. BECAUSE OF THE SMALL SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL DUCT AND PIPING OFFSETS, FITTINGS AND ACCESSORIES THAT MAY BE REQUIRED.
2. THE LAYOUT SHOWN ON THE DRAWINGS IS BASED ON A PARTICULAR MAKE OF EQUIPMENT. IF ANOTHER MAKE OF EQUIPMENT IS USED WHICH REQUIRES MODIFICATION OR CHANGE OF ANY DESCRIPTION FROM THE DRAWINGS OR SPECIFICATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE AS PART OF THIS WORK, FOR MAKING ALL SUCH MODIFICATIONS AND CHANGES, INCLUDING THOSE INVOLVING OTHER TRADES WITH THE COST THEREOF INCLUDED IN HIS BID. IN SUCH CASE, CONTRACTOR SHALL SUBMIT DRAWINGS AND SPECIFICATIONS PRIOR TO STARTING WORK SHOWING ALL SUCH MODIFICATIONS AND CHANGES. HIS PROPOSAL SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER'S CONSTRUCTION MANAGER.

F. DISCREPANCIES IN DOCUMENTS

- 1. DRAWINGS (PLANS, SPECIFICATIONS, AND DETAILS) ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION AND INTENT OF THE MECHANICAL SYSTEMS. WHERE DRAWINGS, EXISTING SITE CONDITIONS, SPECIFICATIONS OR OTHER TRADES CONFLICT OR ARE UNCLEAR, ADVISE THE GENERAL CONTRACTOR IN WRITING, PRIOR TO SUBMITTAL OF BID. THE GENERAL CONTRACTOR IS RESPONSIBLE TO ADVISE THE OWNER'S CONSTRUCTION MANAGER, IN WRITING, OF VARIATIONS TO CONTRACT DOCUMENTS PRIOR TO SUBMISSION OF BID. OTHERWISE, OWNER'S CONSTRUCTION MANAGER'S INTERPRETATION OF CONTRACT DOCUMENTS OR CONDITIONS SHALL BE FINAL WITH NO ADDITIONAL COMPENSATION PERMITTED.

G. TRADE NAMES AND MANUFACTURERS

- 1. WHERE TRADE NAMES AND MANUFACTURERS ARE USED ON THE DRAWINGS OR IN THE SPECIFICATIONS, THE EXACT EQUIPMENT SHALL BE USED AS A MINIMUM STANDARD FOR THE BASE BID. MANUFACTURERS CONSIDERED AS AN EQUAL OR BETTER IN ALL ASPECTS TO THAT SPECIFIED WILL BE SUBJECT TO APPROVAL IN WRITING BY THE OWNER'S CONSTRUCTION MANAGER PRIOR TO ACCEPTANCE. THE USE OF ANY UNAUTHORIZED EQUIPMENT SHALL BE SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.

H. SHOP DRAWINGS

- 1. SUBMIT SIX COPIES OF MATERIAL LISTS AND SHOP DRAWINGS FOR ALL EQUIPMENT AND DUCT FABRICATION DRAWINGS TO THE OWNER'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO ORDERING EQUIPMENT. SUBMISSIONS MUST BE EARLY ENOUGH TO ALLOW THE OWNER'S CONSTRUCTION MANAGER EIGHT WORKING DAYS FOR REVIEW WITHOUT CAUSING DELAYS OR CONFLICTS TO THE JOB'S PROGRESS. SUBMITTALS SHALL BE IN ACCORDANCE WITH THE GENERAL CONDITIONS USING THE MANUFACTURER'S LISTED ON THE DRAWINGS. SHOP DRAWINGS SHALL INCLUDE ALL DATA THAT PERTAINS TO THE REQUIREMENTS SET FORTH ON THE DRAWINGS AND IN THE SPECIFICATIONS. THE SUBMITTAL SHALL INCLUDE BUT NOT LIMITED TO CUTS OR CATALOGS INCLUDING DESCRIPTIVE LITERATURE AND CHARACTERISTICS OF EQUIPMENT SHALL SHOW MAJOR DIMENSIONS, ROUGHING-IN DATA, CAPACITY, CURVES, PRESSURE DROP, CODE COMPLIANCE, MOTOR AND DRIVE DATA AND ELECTRICAL DATA. OBSERVE SPECIAL INSTRUCTIONS WHEN REQUIRED. SUBMITTALS SHALL BEAR THE STAMP OF THE GENERAL AND SUB-CRONTACTOR SHOWING THAT HE HAS REVIEWED AND CONFIRMED THAT THEY ARE IN CONFORMANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS OR INDICATE WHERE EXCEPTIONS TAKE PLACE. LACK OF SUCH CONTRACTOR'S REVIEW AND APPROVAL WILL BE CAUSE FOR REJECTION WITHOUT REVIEW BY OWNER'S CONSTRUCTION MANAGER. ALL SHOP DRAWINGS MUST APPEAR IN THE OPERATION AND MAINTENANCE MANUALS LEFT ON SITE AT JOB COMPLETION.
2. OWNER'S CONSTRUCTION MANAGER'S REVIEW OF SHOP DRAWINGS OR SCHEDULES SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS, OMISSIONS OR OTHER DEFICIENCIES OR DEVIATIONS IN THE SHOP DRAWING FROM THE CONTRACT DRAWINGS AND SPECIFICATIONS.

J. RECORD DRAWINGS

- 1. THE CONTRACTOR SHALL MAINTAIN ONE COPY OF DRAWINGS AND SPECIFICATIONS ON THE JOB SITE TO RECORD DEVIATIONS FROM CONTRACT DRAWINGS, SUCH AS:
a. LOCATION OF CONCEALED PIPING VALVES AND DUCTS.
b. REVISIONS, ADDENDUMS, AND CHANGE ORDERS.
c. SIGNIFICANT DEVIATIONS MADE NECESSARY BY FIELD CONDITIONS, APPROVED EQUIPMENT SUBSTITUTIONS, AND CONTRACTOR'S COORDINATION WITH OTHER TRADES.
d. EXACT ROUTING OF ALL SANITARY AND DOMESTIC WATER PIPING UNDER FLOOR.
2. AT COMPLETION OF THE PROJECT AND BEFORE FINAL APPROVAL, THE CONTRACTOR SHALL MAKE ANY FINAL CORRECTIONS TO DRAWINGS AND CERTIFY THE ACCURACY OF EACH PRINT BY SIGNATURE THEREON. THE DRAWINGS ARE TO BE TURNED OVER TO THE OWNER.

K. GUARANTEE

- 1. THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORK UNDER HIS CONTRACT AND SHALL MAKE GOOD, REPAIR OR REPLACE AT HIS OWN EXPENSE, ANY DEFECTIVE WORK, MATERIAL, OR EQUIPMENT WHICH MAY BE DISCOVERED WITHIN A PERIOD OF 12 MONTHS FROM THE DATE OF ACCEPTANCE (IN WRITING) OF THE INSTALLATION BY THE OWNER'S CONSTRUCTION MANAGER. PROVIDE EXTENDED WARRANTIES AS SPECIFIED WITH INDIVIDUAL EQUIPMENT. IN CASE OF REPLACEMENT OR REPAIR OF EQUIPMENT DUE TO FAILURE WITHIN GUARANTEE PERIOD, GUARANTEE ON THAT PORTION OF WORK SHALL BE EXTENDED FOR A PERIOD OF ONE (1) YEAR FROM DATE OF SUCH REPLACEMENT OR REPAIR.

L. OPERATIONS MANUALS

- 1. ONE COPY OF EACH OPERATION AND MAINTENANCE MANUAL FOR ALL EQUIPMENT FURNISHED ON JOB SHALL BE COLLECTED AND INSERTED IN A 3" THREE RING BINDER AND TURNED OVER TO THE OWNER. EACH NOTEBOOK SHALL INCLUDE BUT NOT BE LIMITED TO INSTALLATION, MAINTENANCE AND OPERATING INSTRUCTIONS, PAMPHLETS OR BROCHURES APPROVED SHOP DRAWINGS AND WARRANTIES OBTAINED FROM EACH MANUFACTURER OF PRINCIPAL ITEMS OF EQUIPMENT.

M. SLEEVES

- 1. THE CONTRACTOR SHALL PROVIDE SLEEVES TO PROTECT EQUIPMENT OR FACILITIES IN THE INSTALLATION. EACH SLEEVE SHALL EXTEND THROUGH ITS RESPECTIVE FLOOR, WALL OR PARTITION AND SHALL BE CUT FLUSH WITH EACH SURFACE EXCEPT SLEEVES THAT PENETRATE THE FLOOR, WHICH SHALL EXTEND 2" ABOVE THE FLOOR.
2. ALL SLEEVES AND OPENINGS THROUGH FIRE RATED WALLS AND/OR FLOORS SHALL BE FIRE SEALED WITH CALCIUM SILICATE, SILICONE "RTV" FOAM, "3M" FIRE RATED SEALANTS OR EQUAL, SO AS TO RETAIN THE FIRE RATING OF THE FLOOR OR WALL. CONFORM TO U.L. ASSEMBLY RATING OF FLOOR OR WALL.
3. SLEEVES IN BEARING AND MASONRY WALLS, FLOORS, AND PARTITIONS SHALL BE STANDARD WEIGHT STEEL PIPE FINISHED WITH SMOOTH EDGES. FOR OTHER THAN MASONRY PARTITIONS, THROUGH SUSPENDED CEILINGS, OR FOR CONCEALED VERTICAL PIPING, SLEEVES SHALL BE NO. 22 U.S.G. GALVANIZED STEEL MINIMUM.
4. DUCT SLEEVES TO BE MINIMUM 14 GAUGE STEEL.

N. HANGERS

- 1. HANGERS SHALL INCLUDE ALL MISCELLANEOUS STEEL SUCH AS ANGLE IRON, BANDS, C-CLAMPS WITH RETAINING CLIPS, CHANNELS, HANGER RODS, ETC., NECESSARY FOR THE INSTALLATION OF WORK.
2. HANGERS SHALL BE FASTENED TO BUILDING STEEL, CONCRETE, OR MASONRY, BUT NOT TO PIPING OR DUCTWORK. HANGING FROM METAL DECK IS NOT PERMITTED. HANGERS MUST BE ATTACHED TO UPPER CHORD OF BAR JOIST. WHERE INTERFERENCES OCCUR, IN ORDER TO SUPPORT DUCTWORK OR PIPING, THE CONTRACTOR MUST INSTALL TRAPEZE TYPE HANGERS OR SUPPORTS WHICH SHALL BE LOCATED WHERE THEY DO NOT INTERFERE WITH ACCESS TO FIRE DAMPERS, VALVES, ACCESS DOORS AND OTHER EQUIPMENT SERVICE REQUIREMENTS AND/OR OTHER TRADES.
3. HANGERS FOR ALL INSULATED PIPING SHALL BE SIZED AND INSTALLED FOR THE OUTER DIAMETER OF INSULATION. INSTALL 6" LONG SPLIT CIRCLE GALVANIZED SADDLE BETWEEN THE HANGER AND THE PIPE INSULATION.
4. HANGERS AND PIPING OF DISSIMILAR METALS SHALL BE DI-ELECTRICALLY SEPARATED FROM ONE ANOTHER.

O. ACCESS DOORS

- 1. FURNISH STEEL ACCESS DOORS AND FRAMES, MIN. 16" X 20" OR AS SHOWN ON DRAWINGS, TO GENERAL CONTRACTOR FOR ALL LOCATIONS WHERE NECESSARY TO PROVIDE ACCESS TO CONCEALED VALVES, AND OTHER EQUIPMENT REQUIRING SERVICE OR INSPECTION. LOCATION, TYPE, SIZE AND NUMBER AS DETERMINED BY CONTRACTOR AND APPROVED BY OWNER CONSTRUCTION MANAGER TO SUIT EQUIPMENT REQUIREMENTS. GENERAL CONTRACTOR WILL INSTALL ACCESS DOORS AND FRAMES.
2. ACCESS DOORS LOCATED IN FIRE-RATED WALLS, FLOORS, CEILING-FLOOR OR CEILING-ROOF ASSEMBLIES SHALL BE FIRE RATED, UNDERWRITER'S LABORATORIES INC. LISTED AND LABELED.
3. ACCESS DOORS SHALL BE FLUSH TYPE, MANUFACTURED FROM NO. 14 GAUGE STEEL, COMPLETE WITH FLUSH FLANGE TYPE FRAMES MANUFACTURED FROM NO. 16 GAUGE STEEL, PROVIDED WITH ANCHORS. ACCESS DOORS SHALL BE SUITABLE FOR INSTALLATION IN WALL OR CEILING MATERIALS SHOWN IN ROOM FINISH SCHEDULES.

P. ELECTRICAL MOTORS

- 1. FURNISH, INSTALL AND ALIGN ALL MOTORS REQUIRED FOR THIS EQUIPMENT, ASSOCIATED WIRING AND SAFETY SWITCHES FOR SUCH MOTORS SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. STARTERS SHALL MEET ALL REQUIREMENTS AS DEFINED IN THE ELECTRICAL DIVISION OF THE SPECIFICATIONS UNLESS THEY ARE FACTORY INSTALLED ON THE UNIT.
2. DESIGN, CONSTRUCTION AND PERFORMANCE CHARACTERISTICS OF MOTORS SHALL CONFORM TO ALL APPLICABLE PROVISIONS OF LATEST NEMA, ANSI, IEEE STANDARDS FOR ELECTRICAL EQUIPMENT. ALL MOTORS SHALL BE SUITABLE FOR OPERATION ON VOLTAGE VARIATION OF PLUS OR MINUS 10% 40 DEGREES C AMBIENT TEMPERATURE; HAVE A SERVICE FACTOR OF NOT LESS THAN 1.15.

Q. LOW VOLTAGE (24 VOLT) WIRING

- 1. THE CONTRACTOR IS TO INSTALL ALL LOW VOLTAGE WIRING REQUIRED FOR HIS EQUIPMENT. THIS WORK INCLUDES ALL TRANSFORMERS AND DEVICES TO MAKE THIS A COMPLETE FUNCTIONAL SYSTEM.
2. ALL WORK IS TO CONFORM TO THE LATEST ADDITION N.E.C. AND TO DIVISION 16 ELECTRICAL SPECIFICATIONS.
3. ANY CONDUIT REQUIRED BY CODE WILL BE INSTALLED BY THE ELECTRICAL SUBCONTRACTOR.

DIVISION 15 – MECHANICAL

SECTION 15500  
HEATING, VENTILATION, AND AIR CONDITIONING

A. SCOPE OF WORK

- 1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT, SERVICES, TOOLS, TRANSPORTATION AND FACILITIES NECESSARY FOR, REASONABLY IMPLIED AND INCIDENTAL TO, THE FURNISHING, INSTALLATION, COMPLETION AND TESTING OF ALL THE WORK FOR THE MECHANICAL SYSTEMS AS SHOWN ON THE DRAWINGS, CALLED FOR IN THE SPECIFICATIONS, AND AS REQUIRED BY JOB CONDITIONS, TO INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:
a. HVAC UNITS, EQUIPMENT, AND APPURTENANCES.
b. DUCTWORK, FITTINGS, DAMPERS, AND INSULATION.
c. HYDRONIC PIPING AND INSULATION (AS APPLICABLE, REFER TO PLANS).
d. REFRIGERANT PIPING (AS APPLICABLE, REFER TO PLANS).
e. DIFFUSERS, GRILLES, AND REGISTERS.
f. CURBS AND STEEL FRAMING FOR SUPPORT (AS APPLICABLE, REFER TO PLANS).
g. TESTING, ADJUSTING, AND BALANCING.
h. OPERATIONS MANUALS.
i. TEMPERATURE CONTROLS AND RELATED DIAGRAMS.
j. SEQUENCES OF OPERATION.
2. BEFORE STARTING WORK, THIS CONTRACTOR SHALL EXAMINE THE ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL PLANS AND SPECIFICATIONS TO SEQUENCE, COORDINATE, AND INTEGRATE THE VARIOUS ELEMENTS OF THE HVAC SYSTEM, MATERIALS, AND EQUIPMENT WITH OTHER CONTRACTORS TO AVOID INTERFERENCES AND CONFRONTATIONS.

B. HVAC EQUIPMENT

- 1. PRIMARY HEATING, VENTILATION AND AIR CONDITIONING UNITS ARE TO BE BY AS SHOWN ON DRAWING. ALL COMPRESSORS ARE TO INCLUDE A 5 YEAR EXTENDED WARRANTY.
a. ALL EQUIPMENT SHALL BE COMPLETE IN EVERY RESPECT WITH ALL DEVICES, APPURTENANCES, AND ACCESSORIES PROVIDED TO MEET THE DESIGN INTENT AND OPERATION OF THE SYSTEMS SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN.
b. EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ALL AIR CONDITIONING EQUIPMENT MUST HAVE A CONDENSATE DRAIN AND BE TRAPPED IN ACCORDANCE WITH MANUFACTURERS DATA. SEE DRAWINGS FOR ADDITIONAL DETAILS.
c. SECONDARY DRAIN PANS ARE REQUIRED TO BE INSTALLED BENEATH ALL INDOOR AIR CONDITIONING EQUIPMENT WITH THE EXCEPTION OF VAV BOXES. SECONDARY PANS ARE TO PROTECT ENTIRE UNIT. PROVIDE CONDENSATE PUMPS, AS REQUIRED. CONDENSATE SHALL BE DIRECTED TO SINK OR AS SPECIFIED ON PLANS.

2. VARIABLE VOLUME DAMPERS
a. WHERE SHOWN ON DRAWINGS, PROVIDE VAV DAMPERS COMPLETE WITH CONTROLS. ALL DUCT CONNECTIONS, FLEXIBLE DUCT/PIPE CONNECTIONS SHALL BE PROVIDED BY THE CONTRACTOR.

3. TOILET EXHAUST FANS
a. WHERE SHOWN ON DRAWINGS, PROVIDE A TOILET EXHAUST FAN UNIT COMPLETE WITH GRAVITY BACK DRAFT DAMPERS. ALL DUCTWORK, ROOF OPENINGS AND CAPS NECESSARY TO PROVIDE A COMPLETE EXHAUST SYSTEM SHALL BE PROVIDED BY THE CONTRACTOR. REFER TO PLANS FOR APPLICABILITY.

4. BASEBOARD, CABINET, AND UNIT HEATERS
a. WHERE SHOWN ON DRAWINGS, PROVIDE ELECTRIC HEATERS COMPLETE WITH ELECTRIC HEATING COIL, CONTROLS, AND INTEGRAL THERMOSTAT.

5. INLINE PUMPS
a. WHERE SHOWN ON DRAWINGS PROVIDE AN INLINE CLOSE COUPLED PUMP(S), BRONZE FITTED PUMPS SHALL BE FURNISHED WITH BRONZE CASE WEARING RINGS, BRONZE SHAFT SLEEVE AND MECHANICAL SHAFT SEAL. PUMPS TO BE SO CONSTRUCTED THAT THEY MAY BE MOUNTED IN A HORIZONTAL OR VERTICAL PIPE LINE. MOTOR TO BE 1750 RPM UNLESS NOTED OTHERWISE.

6. VIBRATION ISOLATION DEVICES
a. VIBRATION ISOLATION DEVICES SHALL BE PROVIDED IN ALL SUPPORTS BETWEEN VIBRATING EQUIPMENT (FANS, ROOFTOP UNITS, AIR HANDLERS, FAN POWERED VAV BOXES, ETC.) AND STRUCTURE.
b. VIBRATING EQUIPMENT HUNG FROM STRUCTURE SHALL BE ISOLATED WITH RUBBER AND SPRING DEVICES. VIBRATING EQUIPMENT SUPPORTED FROM FLOOR OR DECK SHALL BE ISOLATED WITH HOUSED SPRING MOUNT DEVICES.
c. EXAMINE DEAD LOAD AND OPERATING LOAD CONDITIONS WHEN SELECTING DEVICES. ADJUST FOR PROPER ALIGNMENT AND LOADING. AVOID "GROUNDING" THE ISOLATOR.
d. CHECK HANGER ROD SIZE FOR ALLOWABLE LOADS AT THE ISOLATING DEVICE AND AT THE UPPER AND LOWER ATTACHMENTS TO STRUCTURES, DUCTS, EQUIPMENT, ETC.
e. CONSULT MANUFACTURER FOR APPLICATION DATA.

C. METAL DUCTWORK – NO FIBERGLASS DUCT ALLOWED

1. NO DUCTWORK SHALL BE FABRICATED PRIOR TO APPROVAL BY THE OWNER'S CONSTRUCTION MANAGER. SIGNIFICANT DEVIATIONS FROM DESIGN MUST BE APPROVED BY OWNER'S CONSTRUCTION MANAGER PRIOR TO FABRICATION OR INSTALLATION. ALL DUCT MAINS ARE TO BE RECTANGULAR UNLESS NOTES OTHERWISE. ALL DUCT BRANCHES TO DIFFUSERS ARE TO BE ROUND RIGID TUBE, UNLESS NOTED OTHERWISE. FLEXIBLE DUCT CONNECTIONS TO THE DIFFUSER ARE NOT TO EXCEED 5'-0".

2. EXCEPT AS OTHERWISE INDICATED, FABRICATE AND INSTALL RECTANGULAR DUCTS WITH GALVANIZED SHEET STEEL, IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" OF THE LATEST EDITION. CONFORM TO THE REQUIREMENTS IN THE REFERENCED STANDARD FOR METAL THICKNESS, REINFORCING TYPES AND INTERVALS, THE ROD APPLICATIONS, AND JOINT TYPES AND INTERVALS.

3. EXCEPT WHERE OTHERWISE INDICATED, CONSTRUCT DUCT SYSTEMS TO THE FOLLOWING PRESSURE CLASSIFICATIONS: (VERIFY WHETHER RETURN OR EXHAUST DUCT IS POSITIVE OR NEGATIVE PRESSURE).
a. SUPPLY DUCTS: 2 INCHES WATER GAUGE, POSITIVE PRESSURE. RETURN AND EXHAUST DUCTS: 2 INCHES WATER GAUGE, NEGATIVE PRESSURE. PRESSURE TEST DUCTS FOR LEAKAGE. REMAKE LEAKING JOINTS AND APPLY SEALANTS AS REQUIRED TO FABRICATE A SYSTEM THAT DOES NOT EXCEED 5% LEAKAGE OR LESS AS STATED BY PRESSURE CLASS RATINGS IN SMACNA STANDARDS.

4. AS A MINIMUM, CROSSBREAK ALL FLAT SURFACES OR REINFORCE WITH A BEAD APPROXIMATELY 3/8" WIDE X 3/16" DEEP ON 12" CENTERS TO PREVENT VIBRATIONS.

5. ALL SUPPLY, RETURN AND NON-GREASE EXHAUST DUCT WITH RECTANGULAR ELBOWS GREATER THAN 144 SQUARE INCHES TO HAVE DOUBLE THICKNESS TURNING VANES.

6. INSTALL RIGID ROUND AND RECTANGULAR METAL DUCT WITH SUPPORT SYSTEMS INDICATED IN SMACNA STANDARDS. SUPPORT HORIZONTAL DUCTS WITHIN 2 FEET OF EACH ELBOW AND WITHIN 4 FEET OF EACH BRANCH INTERSECTION USING DOUBLE STRAP HANGERS ON EACH SIDE OF FITTING. SUPPORT VERTICAL DUCTS AT A MAXIMUM INTERVAL OF 16 FEET AND AT EACH FLOOR. NO WOOD SHALL BE USED TO SUPPORT OR BRACE DUCTS. PROVIDE SWAY AND SEISMIC BRACING AS REQUIRED BY STATE AND LOCAL CODES.

7. WHERE DUCTS PASS THROUGH ROOFS AND FLOORS, PROVIDE AS MINIMUM 1-1/2"x1-1/2"x1/8" STEEL ANGLE FRAMES AT EACH SIDE OF OPENING. THE ANNUAL SPACE BETWEEN DUCT AND ANGLE FRAMES SHALL BE CAULKED WITH SILICONE SEALANT OR FIREPROOFED AS REQUIRED BY ASSEMBLY FIRE RATING.

8. ALL TRAVERSE JOINTS AND SEAMS IN SUPPLY AIR DUCT SHALL BE SEALED AIR TIGHT WITH DAP DMC DUCT SEALER. JOINTS ALSO SHALL BE RIVETED OR CONNECTED WITH SHEET METAL SCREWS.

9. SOFT ELASTOMER BUTYL GASKET WITH ADHESIVE BACKING SHALL BE USED TO SEAL FLANGED JOINTS.

10. DUCT TRANSITIONS SHALL NOT EXCEED 30 DEGREES SLOPE EXCEPT AS SPECIFICALLY NOTED OTHERWISE.

11. PROVIDE ACCESS TO ALL MOTORIZED DAMPERS, FIRE DAMPERS, CONTROLS, AND OTHER ITEMS IN DUCTWORK THAT REQUIRE SERVICE OR INSPECTION. IF THE ACCESS PANEL LOCATION IS EXPOSED TO THE SALES AREA, IT MUST BE APPROVED BY THE OWNER'S CONSTRUCTION MANAGER PRIOR TO INSTALLATION. LAY-IN SUPPLY AND RETURN AIR DIFFUSERS, GRILLES AND REGISTERS WITH PLASTER FRAMES MAY BE USED AS ACCESS LOCATIONS.

12. FLEXIBLE CONNECTIONS

- a. FLEXIBLE COLLARS SHALL BE PROVIDED IN ALL CONNECTIONS BETWEEN VIBRATING EQUIPMENT (FANS, ROOFTOP UNITS, AIR HANDLERS, ETC.) AND DUCTS OR CASINGS. ALSO, PROVIDE FLEXIBLE CONNECTIONS WHERE DUCTS CROSS BUILDING EXPANSION JOINTS.
b. FLEXIBLE CONNECTIONS SHALL BE CONSTRUCTED OF NEOPRENE-COATED FLAMEPROOF FABRIC. PROVIDE ADEQUATE JOINT FLEXIBILITY TO ALLOW FOR MOVEMENT AND PREVENT THE TRANSMISSION OF VIBRATION.
c. FLEXIBLE CONNECTION IS TO BE RATED FOR THE OPERATING PRESSURE OF THE SYSTEM.

13. FIRE DAMPERS (WHERE APPLICABLE)

- a. PROVIDE PRIMARY FIRE DAMPERS WHERE INDICATED OR REQUIRED BY CODES. DAMPERS SHALL BE DESIGNED FOR HORIZONTAL OR VERTICAL FLOW OF AIR AS REQUIRED. FIRE DAMPERS SHALL BE UL LABELED.
b. FIRE DAMPERS SHALL HAVE THE BLADES OUT OF THE AIR STREAM AND A 165°F FUSIBLE LINK, TYPE A, AS MINIMUM.
c. PROVIDE ALL NECESSARY FRAMING AND SLEEVES FOR DAMPER MOUNTING PER UL AND CODE REQUIREMENTS.
d. PROVIDE DUCT ACCESS DOORS IN AN ACCESSIBLE LOCATION FOR ALL FIRE DAMPERS. DOOR IS TO BE 20 GA GALVANIZED DOOR WITH QUICK-OPENING LATCH AND PIANO HINGE.

14. FLEXIBLE AIR DUCT

- a. FLEXIBLE AIR DUCT SHALL BE 1" INSULATED CLASS 1 AND RATED FOR THE OPERATING PRESSURE OF THE SYSTEM. DUCT CONSTRUCTION MATERIAL (PLASTIC, CLOTH, ALUMINUM) MUST ADHERE TO LOCAL CODES AND BE INCLUDED AS SUCH IN THE BID.
b. FLEXIBLE AIR DUCTS SHALL BE SUPPORTED EVERY 3'-0" WITH 2" WIDE GALVANIZED STEEL BANDS. MINIMUM SUPPORT FOR EACH SECTION OF FLEXIBLE DUCT PER EACH SECTION.
c. FLEXIBLE DUCT SHALL NOT EXTEND OVER 5'-0" IN LENGTH AT ANY ONE LOCATION.

15. SUPPLY AIR TAKE-OFF FITTINGS

- a. PROVIDE CONICAL OR "BELL-MOUTH" TAKE-OFFS FROM MAIN DUCTWORK TO ROUND BRANCHES. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
b. PROVIDE 45° RECTANGULAR TAKE-OFFS FROM MAIN DUCTWORK TO RECTANGULAR BRANCHES.

16. DAMPERS

- a. PROVIDE MANUAL LOCKING QUADRANT VOLUME CONTROL DAMPERS WITH HANDLE OPERATORS IN EACH BRANCH DUCT AND AS SHOWN ON PLANS TO FACILITATE AIR BALANCING.
b. WHERE ACCESS TO BALANCING DAMPER IS RESTRICTED, YOUNG'S REGULATORS SHALL BE USED.
c. ALL RECTANGULAR DAMPERS IN OUTSIDE AIR, RELIEF AIR, OR RETURN AIR DUCTS ARE TO BE OF OPPOSED BLADE TYPE. ALL OUTSIDE AIR DUCT DAMPERS MUST ALSO BE OF THE LOW LEAKAGE TYPE.
d. ALL MOTORIZED DAMPERS NOT FURNISHED WITH EQUIPMENT ARE TO BE HONEYWELL DAMPERS.

17. DIFFUSERS, GRILLES, AND REGISTERS

- a. PROVIDE DIFFUSERS GRILLES AND REGISTERS AS SCHEDULED. DEVICES TO BE COMPLETE WITH DAMPERS, FRAMES AND ALL ACCESSORIES. FINISH AS INDICATED.
b. INSTALL ALL AIR DEVICES AS LOCATED ON THE ARCHITECTURAL REFLECTED CEILING PLAN.
c. APPROVED MANUFACTURERS: TITUS, PRICE, KRUEGER

18. MEDIUM PRESSURE DUCT

- a. WHERE DUCTWORK IS SPECIFICALLY NOTED AS MEDIUM PRESSURE IT SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA STANDARDS FOR A PRESSURE RATING OF 3 INCHES WATER COLUMN MINIMUM. LABELS REQUIRED BY
b. ALL GAUGES AND REINFORCEMENT MUST MEET WITH THE LATEST EDITION OF SMACNA STANDARDS FOR MEDIUM PRESSURE DUCT AND WITH THE \_\_\_\_\_'S CRITERIA.
c. ALL OTHER ITEMS FROM METAL DUCTWORK SPECIFICATION SECTION APPLY TO THIS SECTION

19. DUCTWORK INSULATION

- a. INSTALL INSULATION PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS, AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES. INSULATION MUST COMPLY WITH NFPA 90A.
b. DUCT SIZES SHOWN ON DRAWINGS ARE INSIDE CLEAR DIMENSIONS. INSULATE SUPPLY AND RETURN AIR RECTANGULAR DUCTWORK. DUCTWORK SHALL BE INTERNALLY INSULATED LINER (MIN. R-6).
c. ALL DUCTWORK OUTSIDE OF THE BUILDING INSULATION ENVELOPE AND OUTSIDE AIR DUCTWORK ABOVE THE CEILING SHALL BE EXTERNALLY INSULATED WITH A MINIMUM OF R-9 DUCT WRAP. ALL INSULATION SHALL BE MAINTAINED WITH A VAPOR BARRIER THROUGHOUT DUCT SYSTEM. ALL JOINTS MUST BE TAPED SO THAT NO INSULATION FIBER IS VISIBLE. EXTEND DUCTWORK INSULATION WITHOUT INTERRUPTION THROUGH WALLS, FLOORS, AND SIMILAR PENETRATIONS.
d. ALL INSULATION SHALL HAVE A FLAME SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING OF NO HIGHER THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM C 411, OR AS REQUIRED BY LOCAL CODES.

20. SYSTEM CLEAN-OUT

- a. DUCTWORK AND AIR HANDLING EQUIPMENT IS TO BE CLEANED OUT AND BLOWN OUT BEFORE PAINTING IS STARTED BY THE GENERAL CONTRACTOR.
b. FILTERS MUST BE IN UNITS AT ANY TIME FANS ARE OPERATED.

D. SYSTEM TESTING, ADJUSTING, AND BALANCING

- 1. TESTING, ADJUSTING AND BALANCING OF ALL WORK SHALL BE MADE BY AN INDEPENDENT CONTRACTOR WHO IS CURRENTLY LICENSED ASSOCIATED AIR BALANCING COUNCIL (AABC) OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) BALANCING CONTRACTOR. NO OTHER BALANCE REPORTS WILL BE REVIEWED OR ACCEPTED. ALL BALANCING WORK MUST BE COMPLETE AND DONE IN ACCORDANCE WITH THE MOST RECENT STANDARDS OF THEIR SOCIETY. PAYMENT OF ALL COSTS FOR TESTING SHALL BE MADE BY THE HVAC CONTRACTOR.

2. THE HVAC CONTRACTOR SHALL INSTALL NEW FILTERS IN ALL UNITS PRIOR TO THE AIR BALANCE. THE COMPLETE AIR BALANCE SHALL TAKE PLACE WITH OUTSIDE AIR DAMPERS IN MINIMUM POSITION.

3. BALANCE AIR AND WATER QUANTITIES TO WITHIN + 5% OF THAT INDICATED ON THE DRAWINGS. ANY REQUIRED CHANGES IN SHEAVES, BELTS, PULLEYS, OR THE ADDITION OF DAMPERS REQUIRED TO ACHIEVE SPECIFIED FLOW RATES SHALL BE PERFORMED BY THE HVAC CONTRACTOR WITH NO ADDITIONAL COST TO THE OWNER.

4. THE BALANCE REPORT SHALL INCLUDE AS A MINIMUM THE FOLLOWING INFORMATION:
a. AABC OR NEBB CERTIFICATION NUMBER AND SIGNATURE OF BALANCING CONTRACTOR.
b. INSTRUMENTATION LIST WITH LAST CALIBRATION DATES.
c. MAKE AND MODEL NUMBERS OF ALL HVAC EQUIPMENT TESTED.
d. AIR CFM AND STATIC PRESSURE READINGS (DISCHARGE AND SUCTION) AS MEASURED BY PITOT TUBE DUCT TRAVERSE AT THE UNIT.
e. MOTOR NAMEPLATE DATA WITH ACTUAL FIELD VOLTAGE AND AMPERAGE READINGS FOR EACH LEG.
f. MOTOR AND FAN RPM'S, SHEAVE SIZES AND BELT SIZES.
g. OUTSIDE, FABRICATE, MIXED AND SUPPLY AIR TEMPERATURES AT FULL COOLING.
h. WATER BALANCE DATA INCLUDING GPM WITH INLET AND OUTLET TEMPERATURE AND PRESSURE READINGS (WHERE APPLICABLE).

i. MAKE AND MODEL NUMBERS OF ALL AIR DISTRIBUTION EQUIPMENT.
j. FINAL BALANCED AIR VOLUMES AT ALL OUTLETS (INCLUDING RETURNS WHERE DUCTED).
k. INDEXED PLAN WITH DIFFUSER AND RETURN LOCATIONS.

5. ALL CONTROL SEQUENCES SHALL BE TESTED (INTERLOCKED EQUIPMENT, SMOKE DETECTORS, SMOKE EVACUATION, ECONOMIZER, ETC.) AND OPERATING STATUS RECORDED IN THE REPORT.

6. THREE COPIES OF THE BALANCE REPORT SHALL BE SUBMITTED THROUGH THE GENERAL CONTRACTOR TO THE OWNER'S CONSTRUCTION MANAGER FOR APPROVAL.

7. THE BALANCING CONTRACTOR SHALL PERFORM ALL APPLICABLE TESTING AND BALANCING FUNCTIONS REQUIRED FOR THE SYSTEM DESIGNED IN THESE DRAWINGS. THE BALANCING CONTRACTOR SHALL CHECK FOR ANY ITEMS THAT THE OWNER DEEMS NECESSARY AT NO ADDITIONAL COST TO THE OWNER.

8. FINAL BALANCE REPORT SHALL BE INCLUDED IN THE OPERATION & MAINTENANCE MANUALS.

E. FINAL HVAC INSPECTIONS

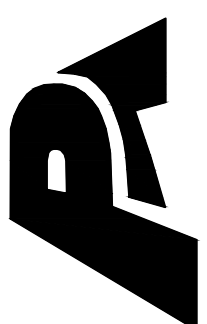
- 1. ASIDE FROM NORMAL INTERIM INSPECTIONS OF WORK IN PLACE, THE OWNER SHALL HAVE THE RIGHT TO AN INDEPENDENT HVAC CONTRACTOR INSPECT THE FINISHED HVAC INSTALLATION UPON COMPLETION FOR COMPLIANCE WITH THE PLANS, SPECIFICATIONS, AND CODES. THE INSTALLING CONTRACTOR WILL BE RESPONSIBLE TO BRING ALL ITEMS REPORTED BY THE INDEPENDENT HVAC CONTRACTOR UP TO PLANS AND SPECIFICATION REQUIREMENTS AT NO COST TO OWNER.

PET SUPPLIES PLUS

1609 Marion-Mt Gilead Rd  
Marion, OH 43302



PONTIA ARCHITECTURE  
39 E. Main Street, Suite 101  
New Albany, Ohio 43054  
614-245-0275



SHEET TITLE

MECHANICAL NOTES

SHEET INFORMATION

PROJECT NUMBER AEG #24020  
DRAWN BY DG  
CHECKED BY DRR  
SCALE AS NOTED  
ISSUE FOR PERMIT  
DATE 02-21-2024

REVISIONS

SHEET NUMBER

M3.0

MECHANICAL NOTES

SCALE: 1/8" = 1'-0"

APPLIED ENGINEERING GROUP, P.L.L.C. 7402 East Broad Street Blacklick, Ohio 43004 Phone: 614.322.7050 Fax: 614.322.7049 www.aegtl.com